PB87-188470

Superfund Record of Decison (EPA Region 2)
Lang Property, Pemberton Township, New Jersey
September 1986

(U.S.) Environmental Protection Agency
Washington, DC

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National Technical Information Service
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September1986

EPA

Superfund Record of Decision:

Lang, NJ

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Lang Property site is a 40-acre parcel of land in a sparsely populated rural area of Pemberton Township, Burlington County, New Jersey. The site is flat and consists of an unpaved access road leading to a 4-acre clearing. Unauthorized disposal of hazardous wastes appears to have occurred over a 2-acre area within the clearing. Abandoned vehicles, tires and other debris are scattered throughout the site. The site is located within New Jersey's Pinelands National Reserve, a forest expanse nationally recognized as a valuable environmental resource, and is within the 100-year floodplain. In June 1975, 1200-1500 drums of unidentified chemical waste were discovered in a clearing at the end of the unpaved road. In 1976, Edward and Florence Lang, owners of the property, were ordered by the state to remove all drums and contaminated soil. Prior to removal, the contents of the drums were apparently spilled onto the ground or disposed of in what has been described as "onsite lagoons". The contents of the drums appear to be the source of contamination occurring at the site. The main contaminants of concern at the Lang Property are VOCs and metals, which have contaminated soils, sediments, ground water, and surface water on site.

The selected remedial action at the Lang site includes: excavation of approximately 6500 cubic yards of contaminated soils and waste material with offsite disposal at an approved landfill; extraction and onsite treatment of contaminated ground water with
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Lang Property, NJ Contaminated Media: soil, gw Key contaminants: VOCs, heavy metals		

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16. ABSTRACT (continued)

reinjection of treated water into the aquifer; restoration of the excavated area by filling and grading, including removal of surface debris as necessary; installation of a security fence; and monitoring to ensure remedy effectiveness. Estimated capital costs for the remedy are $2,322,000 with annual O&M costs of $612,000.

RECORD OF DECISION

REMEDIAL ALTERNATIVE SELECTION

Site Lang Property, Pemberton Township, New Jersey

Documents Reviewed

I am basing my decision on the following documents, which describe the analysis of remedial alternatives considered for the Lang Property site:

- Remedial Investigation Report, prepared by C.C. Johnson & Associates, August 1986
- Feasibility Study Report, prepared by C.C. Johnson & Associates, August 1986
- Responsiveness Summary, September 1986
- Staff summaries and recommendations

Description of Selected Remedy

- Excavation of approximately 6500 cubic yards of contaminated soils and waste materials and disposal at an approved off-site landfill facility.
- Extraction and on-site treatment of contaminated groundwater, with reinjection of treated water.
- Restoration of the excavated area by filling and grading, including the removal of surface debris as necessary.
- Installation of a security fence to restrict site access.
- Appropriate environmental monitoring to ensure the effectiveness of the remedial action.

Declarations

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, I have determined that the alternative described above is a permanent remedy that will remove the source of contamination and mitigate any environmental impacts associated with the Lang Property site.

I have further determined that implementation of this remedial action is the lowest cost alternative that is both technologically feasible and reliable. It effectively mitigates and minimizes damages to and provides adequate protection of public health, welfare and the environment. At the same time, it meets all applicable and relevant Federal and State public health and environmental requirements. Further, implementation of the selected remedy is appropriate when balanced against the availability of Trust Fund monies for use at other sites.

The State of New Jersey has been consulted and agrees with the selected remedy.

September 29, 1986
Date

Christopher J. Daggett
Regional Administrator

LANG PROPERTY SITE

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

I. SITE LOCATION AND DESCRIPTION

The Lang Property Site is a 40-acre parcel of land in a sparsely populated rural area of Pemberton Township, Burlington County, New Jersey. Specifically, the site is just south of New Jersey Route 70 off City Line Road in close proximity to the Lebanon State Forest. Figure 1 depicts the location of the site.

The site is flat and consists of an unpaved access road leading to a four-acre clearing. Unauthorized disposal of hazardous wastes appears to have occurred over a two-acre area within this clearing. The remainder of the 40-acre parcel of land supports fields of blueberry plants, most of which are no longer cultivated, and forested areas. Areas of active crop cultivation and nearby dwellings are shown in Figure 2.

There are no permanent residences on the property. A hunting and fishing lodge located near the disposal area was destroyed by fire in the late 1970's, leaving only the foundation. Abandoned vehicles, a large number of tires, and other debris are scattered throughout the site.

II. ENVIRONMENTAL SETTING

This location is within New Jersey's Pinelands National Reserve, a forest expanse which has been recognized as one of the nation's valuable environmental resources. Specifically, the site is located within the Central Pine Barrens Water Quality Critical Area and the Pinelands Preservation Area District.

Surface geology is dominated by the Cohansey Sand Formation, which was identified to a depth of 70 feet at the site. Regionally, the thickness of the Cohansey varies from 0-300 feet and is underlain by the Kirkwood Formation. At this site, the Cohansey and the Kirkwood Formations are not separated by an impermeable layer which would restrict groundwater movement. Ground water at the disposal area is within the 100-year floodplain as identified by the U.S. Department of Housing and Urban Development. The site is drained by a series of man-made drainage ditches, located north and east of the clearing, which flow through wetlands before eventually reaching Rancocas Creek.

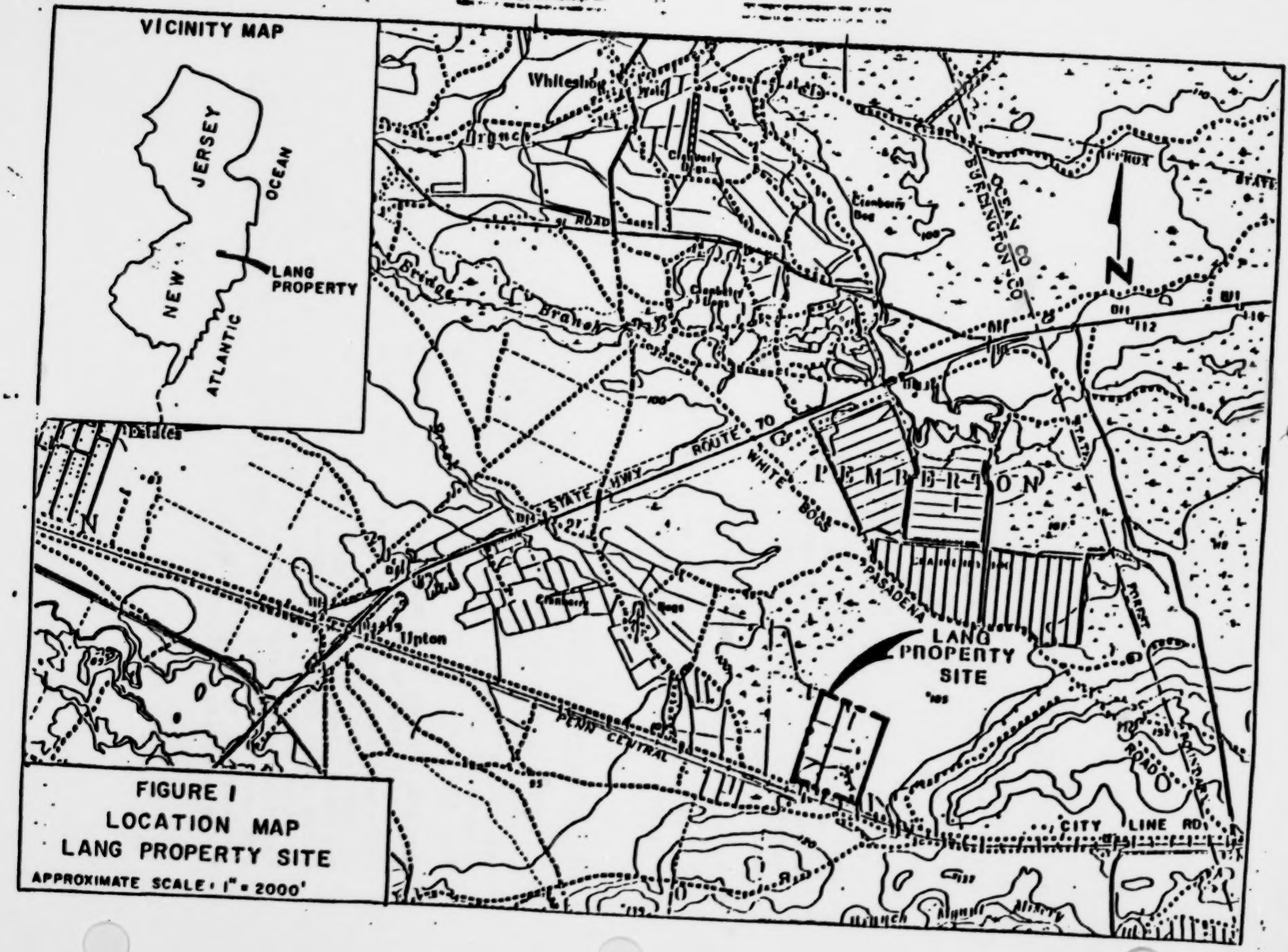

FIGURE I
LOCATION MAP
LANG PROPERTY SITE
APPROXIMATE SCALE: 1" = 2000'

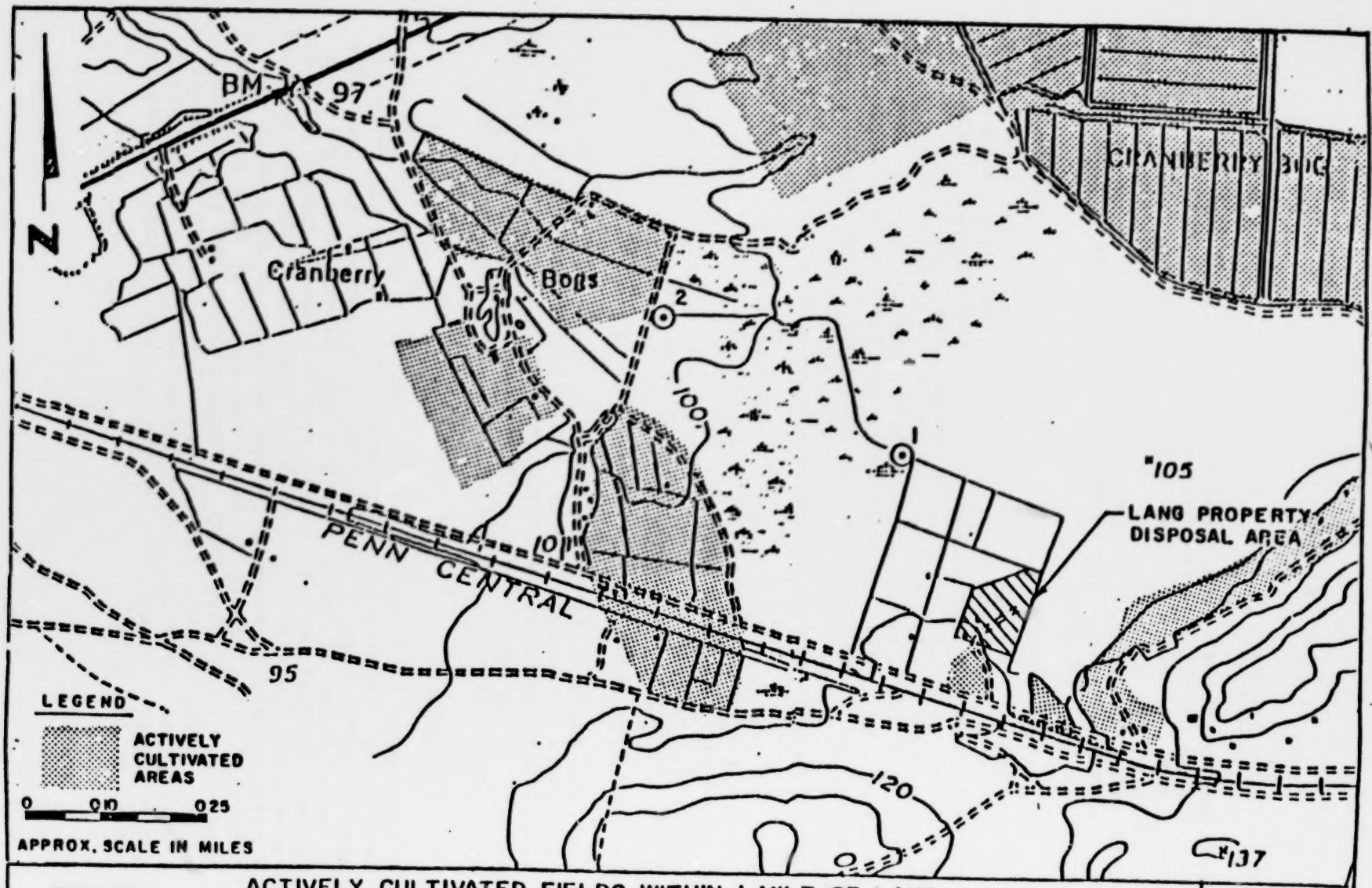

FIGURE 2 ACTIVELY CULTIVATED FIELDS WITHIN I MILE OF LANG PROPERTY (INDENTIFIED FROM AERIAL PHOTOGRAPHS)

LANG RI/FS
CCJA

III. SITE HISTORY

Portions of the 40-acre property surrounding the two-acre disposal area were used for blueberry farming between 1965 and 1970. Sever small blueberry fields are still actively cultivated on parcels of the property that are not part of the disposal area. Currently, the area supports no other industrial, commercial, or residential use. The property was purchased by Edward and Florence Lang in 1970.

In June 1975, 1200-1500 drums of unidentified chemical waste were discovered in a clearing at the end of the unpaved road leading to the Lang Property Site. Discovery of the site was a result of local police officers observing a truck unloading drums at the site. In 1976, prompted by state legal action, the Langs hired a local contractor to remove the drums and contaminated soils from the site. Prior to their removal, however, the contents of the drums were apparently spilled onto the ground or disposed of in what have historically been described as "on-site lagoons". The contents of the drums appear to be the source of the subsequent contamination occurring at the site.

From 1977 through most of 1979, repeated sampling by the Burlington County Health Department and NJDEP determined that both surface water and ground water at the site were contaminated. In 1980, again prompted by state legal action, the Langs hired a geohydrological consultant to conduct a ground water investigation. In 1980 and 1981, additional site inspections were conducted by State and local authorities.

The Lang Property Site was placed on EPA's National Priorities List (NPL) in December 1982. A Remedial Action Master Plan (RAMP) was completed in 1984. The Remedial Investigation/Feasibility Study (RI/FS) was initiated in May 1985 and completed with the release of the Draft RI/FS report in August 1986.

IV. ENFORCEMENT

In September 1975, NJDEP filed a complaint (Superior Court of New Jersey Chancery Division, Burlington County No. C-95-75) against the owners of the site and a hauler who allegedly disposed of drums at the site. The site owners were required to remove chemical wastes, containers, and contaminated soils and water from the site. Disposal of these materials was to be at a site registered with NJDEP and approved to dispose of such material. This was to be completed within 90 days after the judgment. In January 1980, a Consent Order was entered into between NJDEP and the site owners which required the owners to undertake an investigation to determine the nature and extent of ground water contamination resulting from disposal of chemical wastes at the site.

In February 1985, EPA sent information request letters to the site owners and a number of other entities which appeared to be linked to the hazardous substances and other contaminants which have been detected at the site. The agency will continue its investigations aimed at identifying potentially responsible parties (PRP's) for the site.

To date, neither the site owners nor any other PRP's linked to the site have indicated that they would perform the remedial actions needed at the site.

V. CURRENT SITE STATUS

The RI/FS initiated in May 1985 included investigations of ground water, surface water, sediment, soils, vegetation and air. The conclusions of the RI are as follows:

1. Surficial soils (0-2 feet deep) in a two-acre portion of the fouracre clearing where disposal took place are contaminated with volatile organic compounds and metals. Vertical contamination of soils in those areas of the site known to contain hazardous substances was limited to a depth of twenty feet.

2. Surface water and sediment samples collected from areas of ponded water within the disposal area were contaminated with volatile organics and metals, as were samples collected from a location along the ditch draining the site. This ditch was in a position to receive surface water draining from the on-site disposal area.

3. Shallow ground water beneath the disposal area is contaminated with volatile organic compounds and metals. Contaminants have migrated approximately 300 to 500 feet from the disposal area, principally to the northwest. Ground water below a depth of 30 feet shows no signs of contamination.

4. Based on a review of site conditions, toxicological information concerning plant uptake of chemical contaminants, and sampling of blueberries near the site, there is no evidence of contamination of nearby vegetation attributable to the Lang Property site.

5. No evidence of air contamination was found at the site.

6. No buried drums were found at the site.

A detailed analysis of each aspect of the RI is presented below.

Soil Investigation

Soil sampling locations were selected based on the results of soil screening supported by visual examination and historical aerial photographs of the site. Volatile organic compounds were the most commonly detected substances in soil samples. Soils are contaminated to a much lesser degree with inorganic compounds, notably metals. Summaries of analytical data from surficial (0-2 feet) and subsurface soil samples (2-75 feet) are presented in Tables 1 and 2, respectively. Major criteria in evaluating soil contamination were the concentration of total volatile organics (TVO) and the number of organic compounds detected.

The horizontal extent of soil contamination encompasses approximately two acres of the site and includes major areas of site activity indicated by historical aerial photographs, as well as by the former on-site locations of drums and waste lagoons documented in previous site inspection reports. This area of soil contamination is depicted in Figure 3.

To determine the vertical extent of soil contamination, 49 surficial soil samples (0-2 feet) were collected and analyzed along with split-spoon samples from three monitoring wells. Two of the monitoring wells (1-D, 2-D) were on-site in the area of known contamination, while the third monitoring well was located off-site where contamination was not expected.

Figures 4 and 5 show TVO concentrations versus depth and indicate soil contamination to a depth of approximately twenty feet, with the most severe contamination in the top two feet of surficial soils. Because the reliability of the analytical results for 2-butanone were questionable, these data were deleted from the TVO values. Data from analyses of inorganic compounds in split-spoon samples, like data from soil samples, did not define the contamination problem as well as data from organics analyses. As such, a useful profile of soil contamination could not be developed based solely on inorganics data from split-spoon samples.

Ground Water Investigation

The ground water investigation assessed the degree of existing contamination and the direction and rate of contaminant migration. A total of nineteen monitoring wells were installed at the site. In addition, polyvinyl chloride (PVC) well points were utilized to determine on-site groundwater elevations and to assist in the determination of monitoring well locations. The results of this investigation revealed that the ground water in the on-site disposal area is contaminated with organic and, to a lesser extent, inorganic compounds. A summary of ground water contamination is presented in Table 3. Again, the ground water flows primarily to the northwest (Figures 6 and 7).

TABLE 1

SUMMARY OF SURFICIAL SOIL SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/kg)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/kg)
ORGANICS			
METHYLENE CHLORIDE	700	18	77
ACETONE	1700	5	736
1,1-DICHLOROETHANE	62	2	41
1,2-DICHLOROETHANE	50	1	50
2-BUTANONE	16000	10	1695
1,1,1-TRICHLOROETHANE	980	6	322
1,2-DICHLOROPROPANE	55	1	55
TRICHLOROETHENE	2100	10	763
1,1,2-TRICHLOROETHANE	9	1	9
BENZENE	5	1	5
2-HEXANONE	440	1	440
TETRACHLOROETHENE	17000	9	3528
TOLUENE	200000	40	6980
CHLOROBENZENE	80	7	46
ETHYLBENZENE	14000	7	3030
STYRENE	300	1	300
TOTAL XYLENES	23000	17	2829
PHENOL	3600	12	1159
1,2-DICHLOROBENZENE	36000	6	7027
2-METHYLPHENOL	12000	3	4580
4-METHYLPHENOL	1000	6	427
ISOPHORONE	3600	4	1315
2,4-DIMETHYLPHENOL	330	2	220
BENZOIC ACID	3200	6	2000
NAPHTHALENE	5200	3	1953
2-METHYLNAPHTHALENE	5200	1	5200
4-NITROPHENOL	1600	1	1600
2,4-DINITROTOLUENE	3600	1	3600
N-NITROSODIPHENYLAMINE	3600	4	1538
DI-N-BUTYLPHTHALTE	120	1	120
FLUORANTHENE	330	1	330
PYRENE	3600	3	1620
BUTYL BENZYL PHTHALATE	3600	6	1132

TABLE 1 (CONT.)

SUMMARY OF SURFICIAL SOIL SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/kg)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/kg)
ORGANICS (continued)			
3,3-DICHLOROBENZIDINE	1000	1	1000
BENZO (A) ANTHRACENE	330	1	330
CHRYSENE	330	1	330
DI-N-OCTYL PHTHALATE	1300	7	468
BENZO (B) FLUORANTHENE	330	1	330
BENZO (K) FLUORANTHENE	330	1	330
BENZO (A) PYRENE	330	1	330
DIBENZO (A,H) ANTHRACENE	330	1	330
BENZO (GHI) PERYLENE	330	1	330
1,2-DIPHENYL HYDRAZINE	520	1	520
DIELDRIN	230	32	68
4,4-DDE	160	28	25
4,4-DDD	260	29	54
4,4-DDT	1300	30	255
AROCHLOR 1254	44000	1	44000
INORGANICS			
ALUMINUM	1444	23	499
BARIUM	73	1	73
CALCIUM	1088	44	403
CHROMIUM	51	5	24
COPPER	293	5	96
IRON	3829	37	627
LEAD	506	12	86
MAGNESIUM	2484	3	949
MANGANESE	36	2	23
MERCURY	2.8	16	0.42
TIN	230	6	97
ZINC	3139	28	138

TABLE 2

SUMMARY OF SUBSURFACE SOIL SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/kg)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/kg)
ORGANICS			
CARBON DISULFIDE	3.6	1	3.6
1,1-DICHLOROETHENE	160	2	81
1,1-DICHLOROETHANE	56	2	31
TRANS- 1,2-DICHLOROETHENE	69	3	26
CHLOROFORM	54	1	54
2-BUTANONE	1300	14	225
1,1,1-TRICHLOROETHANE	140	2	71
VINYL ACETATE	8.0	1	8.0
1,1,2,2-TETRACHLOROETHANE	15	1	15
1,2-DICHLOROPROPANE	260	2	138
TRICHLOROETHENE	860	9	268
1,1,2-TRICHLOROETHANE	8.6	1	8.6
BROMOFORM	4.0	1	4.0
2-HEXANONE	46	1	46
4-METHYL-2-PENTANONE	1300	8	640
TETRACHLOROETHENE	390	5	80
TOLUENE	1700	11	196
CHLOROBENZENE	5.5	1	5.5
ETHYLBENZENE	420	4	107
TOTAL XYLENES	1500	5	305
INORGANICS			
CHROMIUM	18	5	11
IRON	4715	15	1886
LEAD	14	2	10
MANGANESE	8.7	1	8.7
MERCURY	0.09	1	0.09
SELENIUM	3.2	1	3.2
VANADIUM	23	2	22
ZINC	10	3	8.7

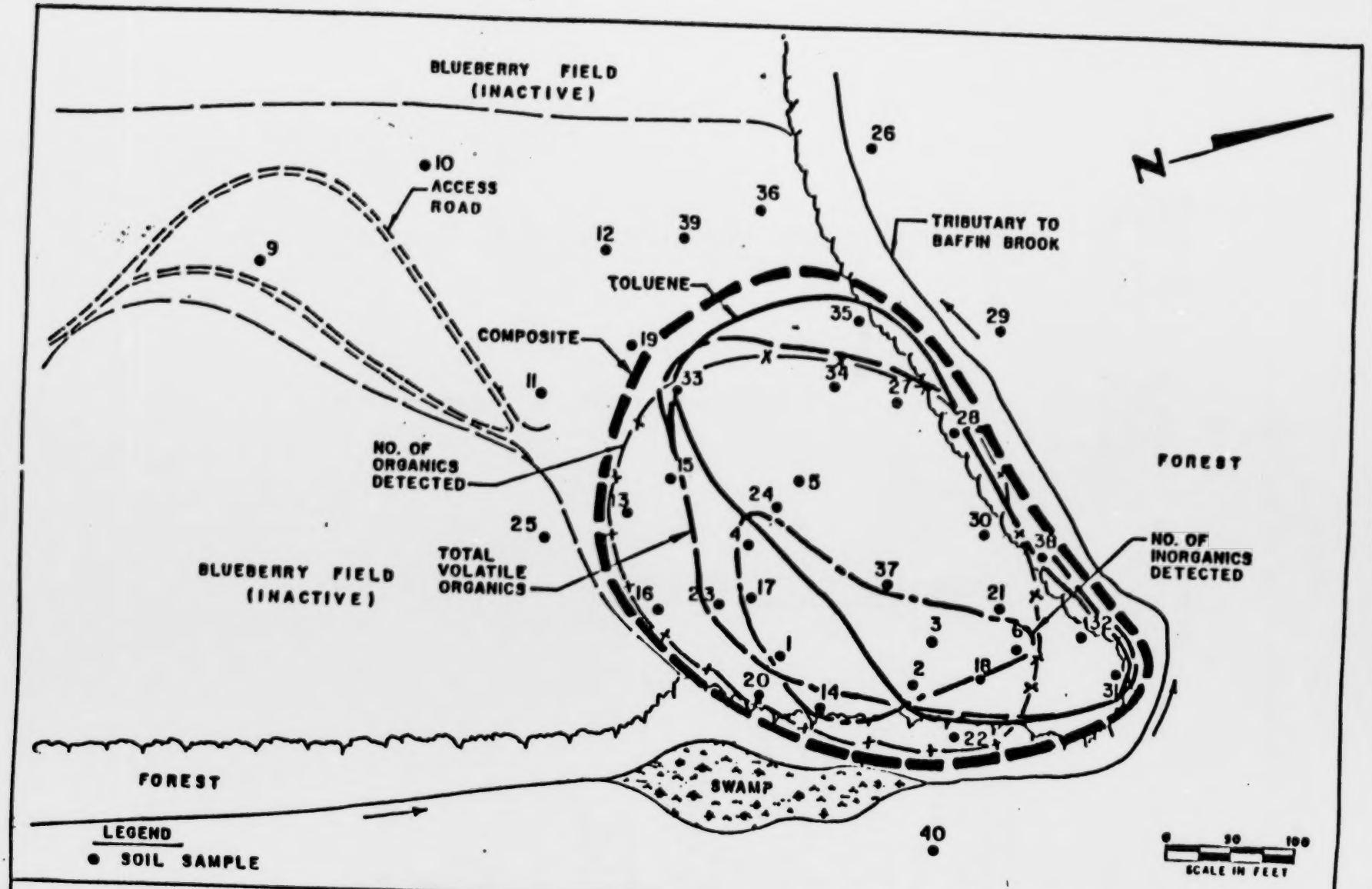

FIGURE 3 SOIL CONTAMINATION AREA DEFINED BY VARIOUS CRITERIA

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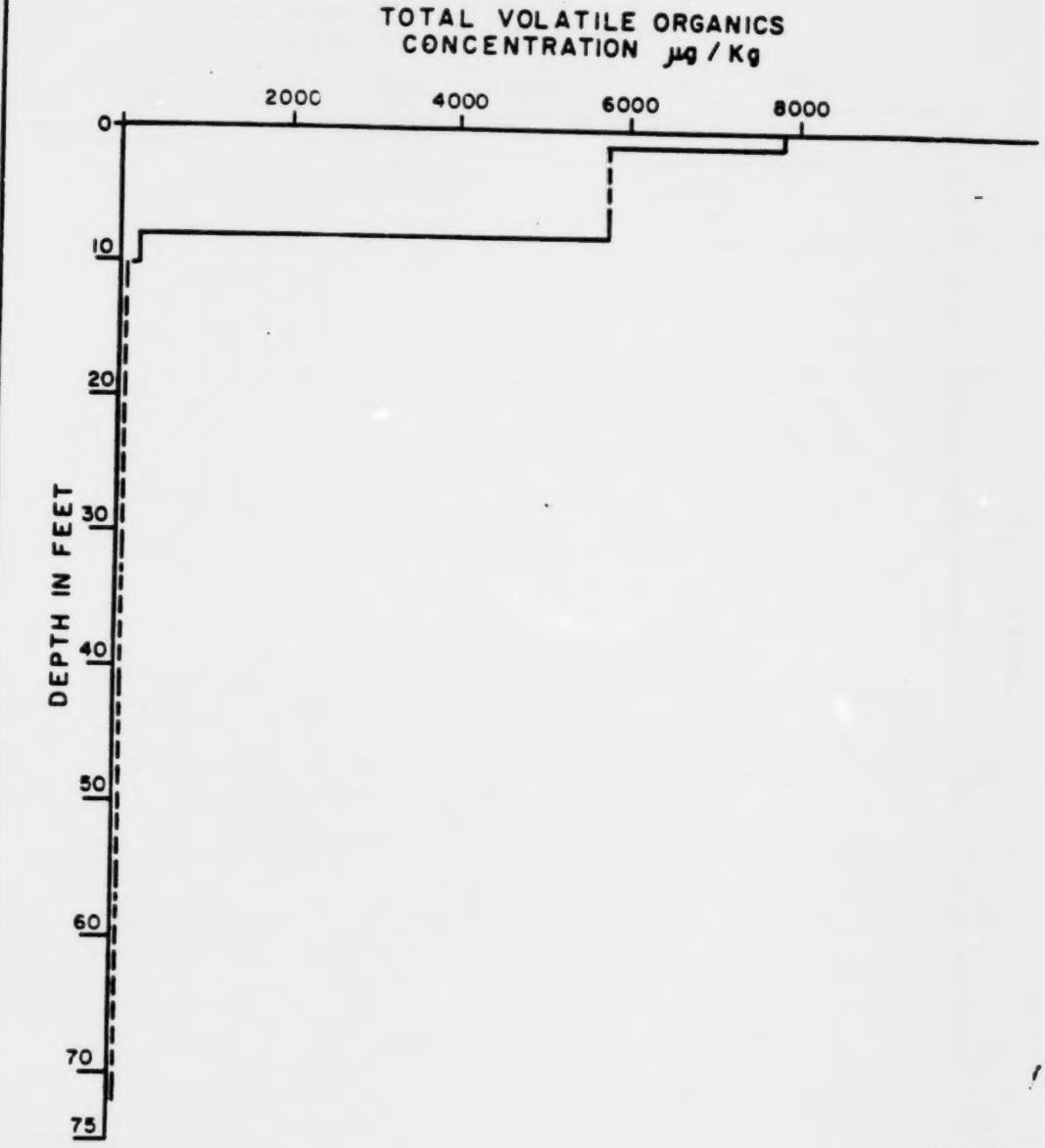

FIGURE 4 TVO CONCENTRATION (EXCEPT 2-BUTANONE) VERSUS DEPTH

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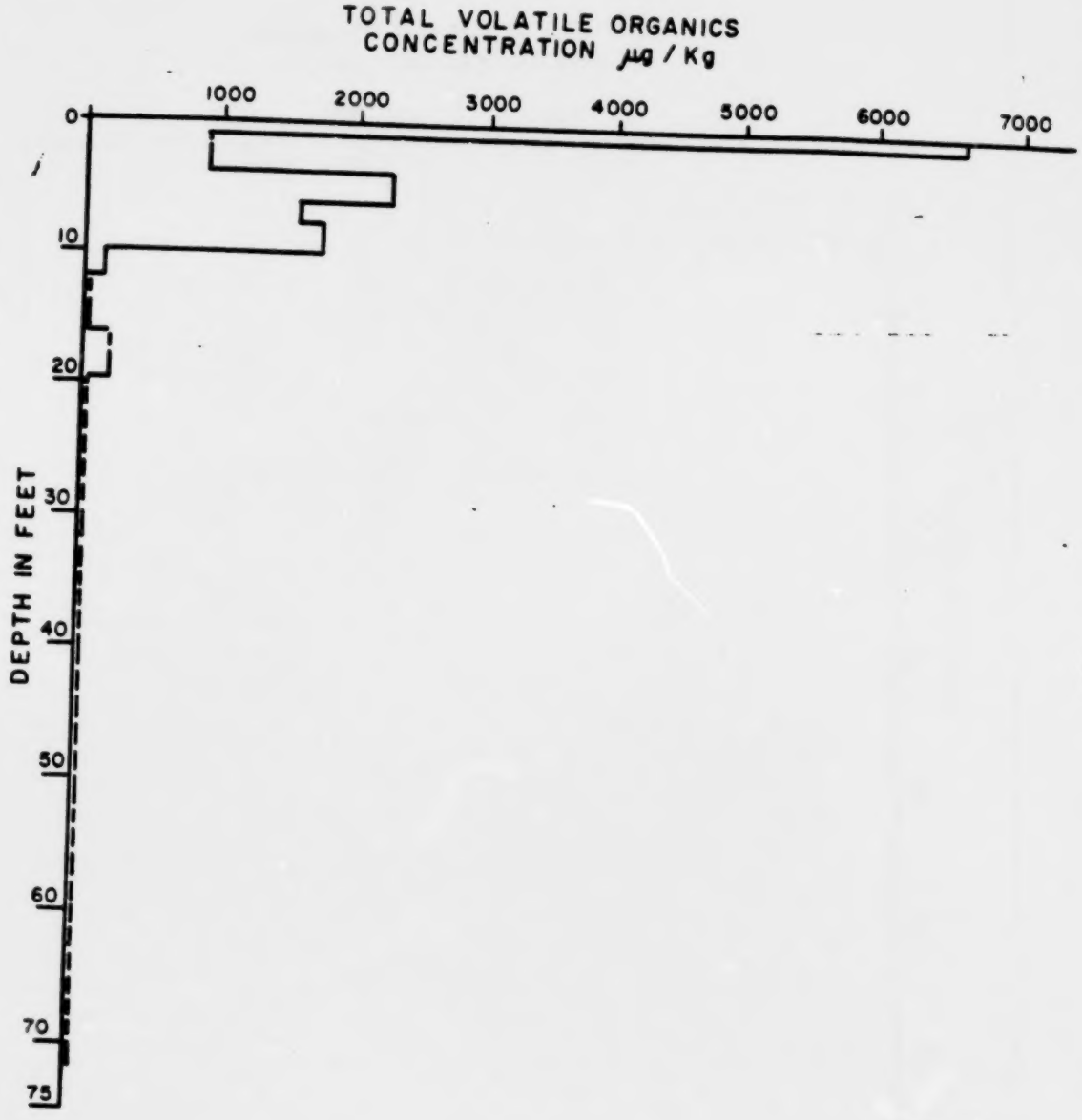

FIGURE 5 TVO CONCENTRATION (EXCEPT 2-BUTANONE) VERSUS DEPTH

LANG RI/FS
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TABLE 3

SUMMARY OF GROUNDWATER MONITORING WELL SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/l)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/l)
ORGANICS			
METHYLENE CHLORIDE	350	1	350
ACCETONE	480	1	480
1,1-DICHLOROETHENE	1400	2	709
1,1-DICHLOROETHANE	4300	2	2154
TRANS-1,2-DICHLOROETHENE	2500	3	942
2-BUTANONE	49	1	49
1,1,1-TRICHLOROETHANE	8200	1	8200
1,2-DICHLOROPROPANE	2800	1	2800
TRICHLOROETHENE	55000	3	18691
BENZENE	1600	1	1600
2-HEXANONE	14000	2	7135
TETRACHLOROETHENE	1500	2	1500
TOLUENE*	15000	3	8242
ETHYL BENZENE	5300	1	5300
TOTAL XYLENES	26000	1	26000
1,4-DICHLOROBENZENE	86	1	86
BENZYL ALCOHOL	170	1	170
ISOPHORONE	14	1	14
2,4-DIMETHYLPHENOL	32	1	32
NAPTHALENE	56	1	56
BIS (2-ETHYLHEXYL) PHTHALATE	8	4	4
4,4-DDT	0.07	1	0.07

*Toluene data was flagged with the data qualifier (B), which denotes that this contaminant was detected in the blanks also.

TABLE 3 (CONT.)

SUMMARY OF GROUNDWATER MONITORING WELL SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/l)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/l)
INORGANICS			
ALUMINUM	56700	14	6532
ANTIMONY	103	4	56
ARSENIC	11	3	9.4
BARIUM	231	17	45.0
BERYLLIUM	1.8	5	1.2
CADMIUM	11	8	4.5
CALCIUM	8220	16	2234
CHROMIUM	491	20	47.0
COBALT	15	7	7.0
COPPER	201	5	78.6
IRON	15700	14	4580
LEAD	74	12	12.6
MAGNESIUM	2060	8	663
MANGANESE	2570	11	277.0
MERCURY	0.6	1	0.6
NICKEL	574	12	68.8
POTASSIUM	7960	10	3323
SILVER	4.1	2	4.1
SODIUM	20200	9	7282
THALLIUM	6.4	2	5.5
VANADIUM	238	16	25.7
ZINC	1300	2	701

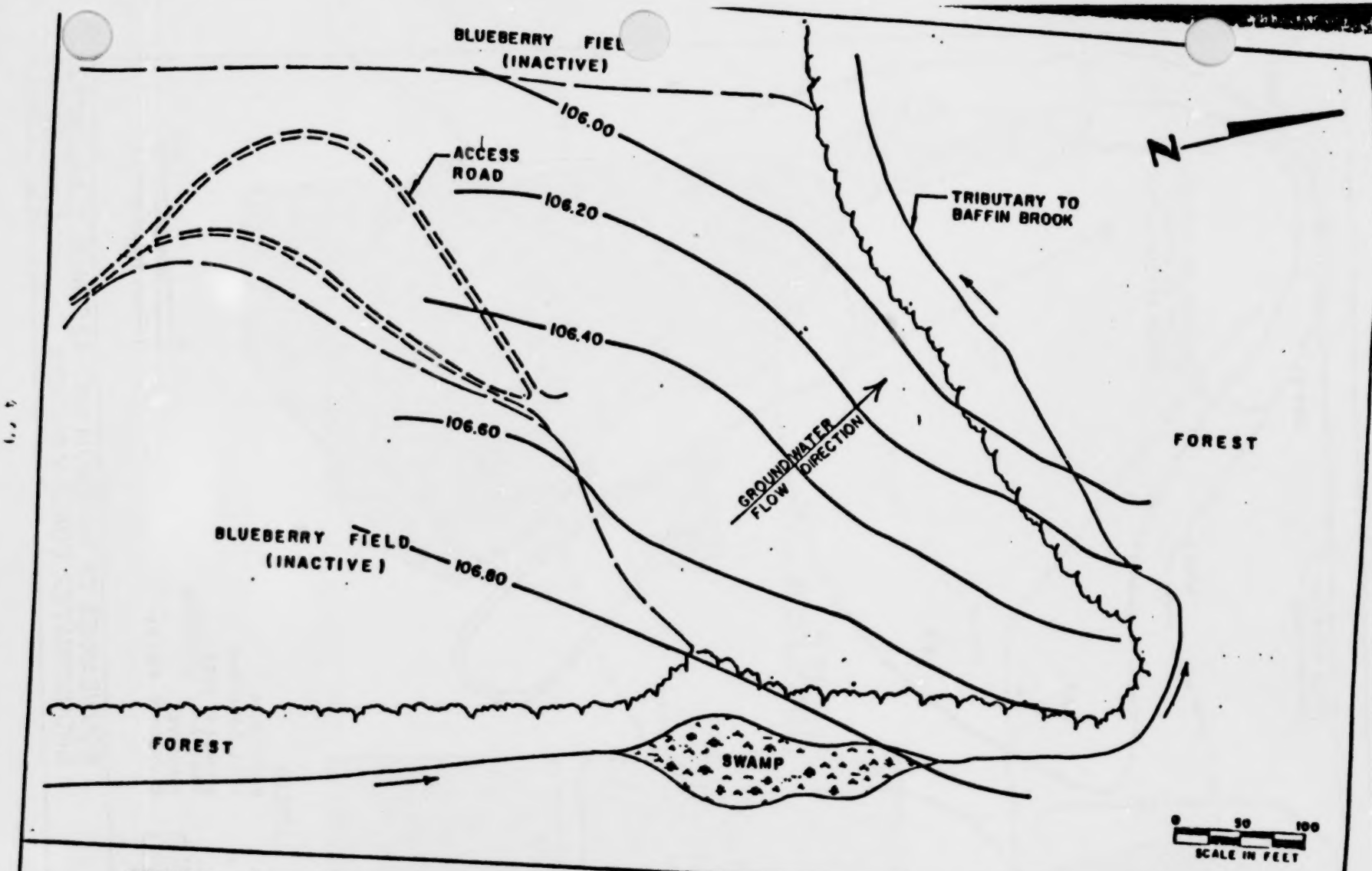

FIGURE 6 GROUNDWATER ELEVATION CONTOUR MAP, DEC., 1985

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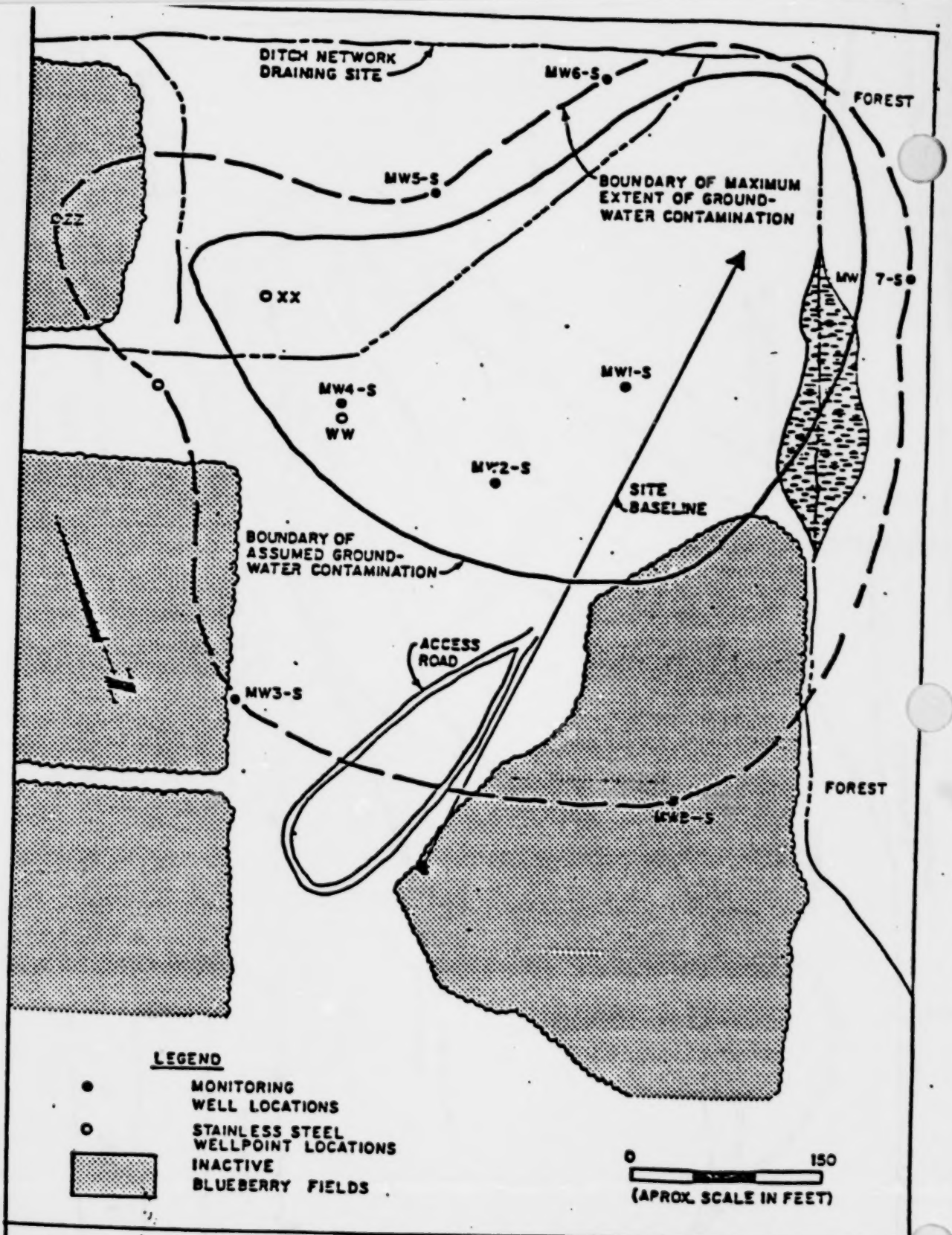

FIGURE 7 BOUNDARIES OF MAXIMUM AND ASSUMED GROUNDWATER CONTAMINATION

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Analysis of water level data collected from three different periods revealed fluctuations in water table elevations. The maximum vertical fluctuation at any given well cluster is less than one foot. Such slight differences in water elevations suggest that very little vertical movement of the ground water occurs beneath the site. Downward migration of contaminated ground water is retarded by the presence of increasingly finer sands and higher silt content with depth. There is no conclusive evidence of ground water contamination below a depth of 11 feet (maximum depth of shallow well screens) and the data indicate no ground water contamination below a depth of 30 feet (minimum depth of intermediate well screens).

Contaminated shallow ground water is probably being intercepted by the ditch draining the site. This contaminated water is travelling very slowly downstream through the ditch, where it is partially bound by sediments and partially volatilized into the air. Contaminants re-entering the ground water from the ditch or moving downgradient under the ditch have not yet reached Well Cluster 5 ("MW5-S" in Figure 7).

In summary, the lack of a strong horizontal gradient and the interaction between the ground water and surface water suggest that contaminants have not migrated more than 300-500 feet from the disposal area.

Surface Water and Sediment Investigation

Surface water and sediment samples collected from areas of ponded water within the on-site disposal area were contaminated with volatile organic compounds, as were samples collected from a location along the ditch draining the site. This ditch could have received surface water draining from the on-site disposal area. Summaries of surface water and sediment contamination, the extent of which is minimal in both cases, are presented in Tables 4 and 5, respectively.

Vegetation Investigation

Given the close proximity of blueberry and cranberry fields, an analysis of potential uptake of contaminants by vegetation was conducted. Based on a review of site conditions, toxicological information concerning plant uptake of chemical contaminants and sampling of blueberries in close proximity to the site, there is no evidence of contamination of nearby vegetation attributable to the site.

Routine air quality monitoring was conducted throughout the on-site field investigations. Analysis of these data showed no evidence of contamination of ambient air, despite some excavation activities at the site.

TABLE 4

SUMMARY OF SURFACE WATER SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/kg)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/l)
ORGANICS			
METHYLENE CHLORIDE	5	1	5
ACETONE	340	1	340
1,1-DICHLOROETHANE	14	1	14
TRANS-1,2-DICHLOROETHENE	6	1	6
1,1,1-TRICHLOROETHANE	9	1	9
1,2-DICHLOROPROPANE	13	1	13
TRICHLOROETHENE	16	1	16
2-HEXANONE	30	2	20
TOLUENE	43	1	43
TOTAL XYLENES	5	1	5
PHENOL	10	2	10
2-METHYLPHENOL	10	1	10
4-METHYLPHENOL	10	1	10
ISOPHORONE	10	1	10
BENZOIC ACID	50	1	50
BIS (2-ETHYLHEXYL) PHTHALATE	10	3	10
DIELDRIN	0.02	3	10
4,4-DDE	0.01	1	0.01
4,4-DDD	0.02	2	0.015
4,4-DDT	0.026	1	0.026
INORGANICS			
ALUMINUM	530	11	298
ANTIMONY	73	1	73
BARIUM	2.6	1	2.6
CADMIUM	5.0	1	5.0
CALCIUM	2390	4	1294
CHROMIUM	6.9	2	5.2
COPPER	15	7	9.2
IRON	2360	2	1364
MAGNESIUM	948	10	513
MANGANESE	63	9	28
NICKEL	89	1	89
POTASSIUM	880	2	796
SILVER	14	1	14
SODIUM	2440	1	2440
VANADIUM	2.5	2	2.1
ZINC	36	7	23

TABLE 5

SUMMARY OF SEDIMENT SAMPLE DATA

CONTAMINANT	MAXIMUM CONCENTRATION DETECTED (ug/kg)	NUMBER OF TIMES DETECTED	AVERAGE OF DETECTED CONCENTRATION (ug/kg)
ORGANICS			
ACETONE	700	7	176
1,1-DICHLOROETHANE	50	1	50
TRANS-1,2-DICHLOROETHENE	13	1	13
CHLOROFORM	6.3	1	6.3
1,2-DICHLOROPROPANE	34	1	34
TRICHLOROETHENE	45	1	45
4-METHYL-2-PENTANONE	8.9	1	8.9
TOLUENE	940	8	253
CHLOROBENZENE	3.5	2	3.2
ETHYLBENZENE	4.7	1	4.7
TOTAL XYLENES	8.6	1	8.6
DIETHYL PHTHALATE	77	1	77
DIELDRIN	210	1	210
4,4-DDD	530	2	287
INORGANICS			
ALUMINUM	758	8	334
CALCIUM	505	9	195
CHROMIUM	51	3	30
COPPER	5.6	1	5.6
IRON	709	7	246
LEAD	17	9	6.1
MANGANESE	7.9	3	6.4
MERCURY	0.38	9	0.28
NICKEL	47	2	31
SILVER	6.3	1	6.3
SODIUM	451	9	335
VANADIUM	21	1	21
ZINC	15	1	15

Public Health Evaluation (Risk Assessment)

To assist in determining the impact of the site on public health and the environment, a public health evaluation was performed for the Lang Property Site. It was determined that substantial risks to human health exist under a number of exposure scenarios. Risk associated with chemical contamination at the site was assessed with respect to current use of the site as well as potential future uses, including residential and agricultural use. Where appropriate, relevant standards were used to assess the impact on the site.

The current-use scenario involving direct contact with soil at the site was found to pose a risk to human health, using reasonable assumptions regarding exposure. The future-use scenarios, which involve use of ground water as a drinking water source and direct contact with soil, would pose substantial human health risks.

In addition to these human health risks, there are significant environmental concerns associated with the site. The Lang Property Site is located within the Central Pine Barrens Water Quality Critical Area and the Pinelands Preservation Area District. Since this site has contaminated soils, ground water, and surface water in these critical areas of the Pinelands, it constitutes an endangerment to the environment. Although estimates of exposure and risk to critical animal species could not be quantified, the concentration of several contaminants in soils, surface water, and ground water appear to be sufficiently high to pose hazards to indigenous fishes, amphibians, and certain mammals and birds.

In summary, the soil, ground water, and environmental studies undertaken at and in the vicinity of the Lang Property site indicated that, among other findings:

1. Both organic and inorganic hazardous substances (HS's) exist in the soil throughout the contaminated two-acre parcel located on the Lang Property. HS's were detected throughout this area to a depth of 20 feet.

2. This two-acre parcel of contaminated soil is in direct contact with the surficial aquifer under the site.

3. The surficial aquifer exhibits elevated levels of specific hazardous substances that are also present in the soil overlying the site.

4. Many of the hazardous substances present on-site were detected in the soil in concentrations which far exceed any background levels expected in off-site soils, as well as any levels detected in soils outside the site boundaries.

5. Some hazardous substances present at the site have entered the surface water flowing across the site.

The environmental studies at the Lang site clearly indicate that:

a. Hazardous substances, as defined in Section 101 (14) of CERCLA, 42 USC 9601 (14), have been and are being released into the environment at the Lang site; and

b. A substantial threat of new and continued release of hazardous substances into the environment exists at the Lang site.

VI. SCREENING OF REMEDIAL TECHNOLOGIES

Objectives

As an initial step in establishing the objectives for remedial action, the following five contaminated media were established as requiring action: shallow ground water, on-site surficial soil, on-site subsurface soil, surface water in the ditch adjacent to the site, and sediments in the ditch adjacent to the site.

For purposes of remedial action, the shallow ground water at the site and the surface water in the ditch can be considered a single medium. Data generated during the RI indicate that water in the ditch may be considered exposed ground water. The Pinelands Commission has also reported that, in general, eighty percent of the surface water in the Pinelands represents ground water discharge. Since the contaminant plume extends to, and possibly beyond, the ditch adjacent to the site, any plume management strategy which addresses contaminated ground water would also address the surface water in the ditch. This approach is desirable considering the limited quantity of water in the ditch and the relatively free interaction between ground water and surface water in the site area.

The same approach may be used in addressing problems associated with contaminated surficial soil on the site and contaminated sediment in the ditch around the site. Managing the sediment contamination problem as part of the on-site soil contamination problem seems to be a viable and cost-effective approach. The negligible flow rate in the ditch and sample analytical results indicate that little downstream migration of sediment contamination has occurred.

Subsurface soil contamination has been evaluated and determined to be a result of movement of contamination through the ground water. Of the chemical wastes disposed of at the site, some

contaminants became bound to the organic matter in the surficial soils while others percolated into the groundwater. Apparently, most contaminants with strong soil binding mechanisms did not move into the groundwater and so were detected only in the surficial soils. The primary indicator used to determine the degree to which an organic contaminant binds to soil particles is the organic carbon partition coefficient (K_{oc}.) A higher K_{oc} for a contaminant is assumed to indicate a greater degree of binding to organic soil particles.

Most of the contaminants detected in the subsurface soils have significantly lower organic carbon partition coefficents than do contaminants detected in the surficial soils alone. This situation, coupled with the lack of organic matter in the subsurface soils, suggests that subsurface soil contamination will be removed as groundwater contamination is removed. When contaminant levels in the extracted ground water approach the effluent discharge standards for the treatment process, sampling will be conducted to document the anticipated corresponding reduction of contamination in the subsurface soil. Therefore, the Feasibility Study focused on remedial alternatives for contaminated surficial soils (including ditch sediments) and contaminated shallow ground water (including surface water and subsurface soils).

At this site, the EPA response measures are dictated by the need to remove significant public health risks presented by current- and future-use scenarios involving direct contact with on-site surface soils, and by future-use scenarios involving ingestion of ground water from the site. In addition, the site is located in New Jersey's Pinelands National Reserve, a forest expanse which has been recognized as one of the nation's valuable environmental resources. Protection of the Pinelands by preserving its unique character and inherent resources is mandated by Federal legislation.

Based on information gathered during the Remedial Investigation, general response actions, or classes of response, were identified. General response actions considered include the "no action" alternative, which will serve as a baseline against which other remedial measures can be compared. Potential technologies were then identified for each general response action. Table 6 summarizes this information.

Remedial Technology Screening

Technologies are discussed relative to the contaminated media to which each is applicable. As explained previously, remedial alternatives focused on contaminated surficial soils (including ditch sediments) and contaminated shallow ground water (including surface water and subsurface soils). Technologies

TABLE 6

GENERAL RESPONSE ACTIONS AND POTENTIAL TECHNOLOGIES
LANG PROPERTY FEASIBILITY STUDY

General Response Action	Technologies
No Action	o Periodic monitoring, sampling and analysis
Containment	o Surface capping
	o Subsurface low-permeability barriers
Pumping	o Pumping of shallow groundwater
Collection	o Subsurface drains to collect shallow groundwater
Diversion	o Subsurface low-permeability barriers
Complete Removal	o Excavation of all on-site contaminated surficial soil
On-site Treatment	o Biological, chemical or physical treatment of groundwater
	o Incineration, solidification or stabilization of on-site contaminated soil
Off-site Treatment	o Removal and transport of the contaminated groundwater and/or soil to an off-site treatment facility
	o Removal of contaminated groundwater, pretreatment and discharge to a Publicly Owned Treatment Works (POTW)
In-situ Treatment	o Bioreclamation
	o Chemical Dextoxification
	o Soil flushing
	o Immobilization
Storage	o Temporary on-site storage
On-site Disposal	o Construction and maintenance of an on-site hazardous waste disposal facility
Off-site Disposal	o Excavation and transport of contaminated soil to a off-site permitted hazardous waste landfill

aimed at remediating each contaminated medium were evaluated and screened on the basis of technical applicability, public health and environmental effects, institutional constraints, and order of magnitude costs. The results of the screening produced feasible remedial action technologies that then were combined into remedial alternative components.

A summary of the screening of technologies based on waste and site characteristics and technical requirements is presented in Table 7. Technical criteria involve the degree to which the technology has been demonstrated to be capable of achieving long-term control of contaminant release or migration from the site. Technologies retained for further evaluation were grouped into remedial strategies for each contaminated medium. Strategies that achieve similiar goals were then evaluated and further screened before being integrated into alternatives that addressed the entire site.

The discussion below addresses those technologies which passed the screening process along with technologies which, while eliminated from further consideration, need to be addressed in this document due to considerations relating to alternative technologies and compliance with other environmental statutes.

Ground Water Control Technologies

Ground water control technologies can be applied to contain, collect, divert, or remove the groundwater in the area of the site in an effort to prevent further migration of contaminants from the site and manage the migration that has already occurred. One such technology is ground water pumping.

Pumping of Ground Water - Ground water pumping is used to control contaminant plumes through adjustment of the water table elevation, containment of the plume, or removal of the plume. Pumping methods are most effective at sites where underlying aquifers have high hydraulic conductivities and contaminants move readily in water. The highly inert and permeable sands underlying the Lang Property site are well suited for pumping.

In particular, the screening process focused on plume removal. Plume removal implies a complete purging of the ground water system. Removal techniques are often suitable when contaminant sources have been removed and aquifer restoration is desired. Extraction wells or extraction and injection wells in combination are used in plume removal. Extraction and injection techniques can also be used in concert with flushing to accelerate contaminant removal. As with containment stategies, treatment of extracted ground water is necessary.

TABLE 7

SCREENING OF POTENTIAL TECHNOLOGIES
LANG PROPERTY FEASIBILITY STUDY

TECHNOLOGY	APPROPRIATE TECHNOLOGY BASED ON: WASTE CHARACTERISTICS	SITE CHARACTERISTICS	TECHNICAL	RETAINED FOR FURTHER EVALUATION
GROUNDWATER CONTROL				
Subsurface Barriers	yes	no	yes	no
Pumping	yes	yes	yes	yes
Subsurface Drains	yes	no	yes	no
GROUNDWATER TREATMENT				
On-site Treatment				
Activated Carbon	yes	yes	yes	yes
Biological	no	yes	yes	no
Precipitation, Flocculation and Sedimentation	yes	yes	yes	yes
Ion Exchange	yes	yes	yes	yes
Sorptive Resins	no	yes	no	no
Reverse Osmosis	yes	yes	yes	yes
Air Stripping	yes	yes	yes	yes
Chemical Oxidation	no	yes	yes	no
Wet Air Oxidation	no	yes	yes	no
Filtration	yes	yes	yes	yes
Off-site Treatment	yes	yes	yes	yes
In-situ Treatment				
Bioreclamation	no	yes	no	no
Chemical Detoxification	no	yes	no	no
SURFICIAL SOILS				
In-situ Treatment				
Bioreclamation	no	yes	no	no
Chemical Detoxification	no	yes	no	no
Soil Flushing	no	yes	yes	no
Immobilization	no	yes	yes	no
Heating	no	yes	no	no
Surface Capping	yes	no	yes	no
On-site Treatment				
Solidification/ Stabilization	no	yes	yes	no
Incineration	no	yes	yes	no
Volatilization	no	yes	yes	no
On-site Disposal	yes	no	yes	no
Off-site Incineration or Disposal	yes	yes	yes	yes

Ground Water Treatment Technologies

On-Site Treatment of Ground Water - At the Lang Property Site, this could be achieved by using a mobile treatment system or building an on-site treatment system. In either case, the treatment system will likely consist of a combination of treatment processes. Processes that may be applicable to this site include the following:

Activated Carbon - This process involves treating a waste stream with carbon, usually by flow through packed bed reactors. This process is especially well suited for removal of mixed organics.

Precipitation, Flocculation, and Sedimentation - Precipitation removes a substance from a solution and transforms it into solid particles. Flocculation promotes particle growth of suspended solids for ease of removal and sedimentation removes settleable particles from the liquid. At the Lang Property site, a treatment unit combining these processes could remove metals and other inorganics from the contaminated ground water, in addition to removing suspended solids.

Ion Exchange - Ion exchange is a process by which toxic ions are removed from the waste stream and replaced with relatively harmless ions held by the ion exchange material. This technology is well established for the removal of heavy metals.

Reverse Osmosis - This process entails the separation of water from a solution by means of pressure exerted on the solution within a semi-permeable membrane that allows only pure water to pass through. Reverse osmosis cannot reliably treat waste with high organic content, as the wastes may dissolve the membrane. At the Lang Property site, the use of this process may be limited to the polishing of a previously treated waste stream.

Air Stripping - Air stripping is a mass transfer process in which volatile organic contaminants in water are transferred to gas. Air stripping is particularly suited to the Lang Property Site due to the presence of significant concentrations of volatile organics in the ground water.

Filtration - Suspended solids can be separated from a solution by passing the solution stream through a bed of filter media. At this site, filtration may be employed prior to air stripping or activated carbon adsorption to reduce the potential for biological growth, clogging and the suspended solids load on these units. Filtration could also be used as part of a polishing unit to remove residual floc from the effluent of a precipitation, flocculation, and sedimentation process.

Off-Site Treatment - Untreated ground water from the site can be transported to a treatment facility for pretreatment of the ground water and discharge to a Publicly Owned Treatment Works (POTW). Some of the treatment facilities located in the northeastern United States include: DuPont Environmental Services, Waste Conversion, Inc., CECOS International, and the Pemberton Township Municipal Utilities Authority (PTMUA). Any of these may be capable of handling a waste stream from the Lang Property site.

The PTMUA operates a 2.5 MGD capacity activated sludge treatment plant located in Birmingham, New Jersey. Effluent from this plant is discharged to the north branch of Rancocas Creek and the sludge is applied to agricultural land. The PTMUA service area extends to Country Lake Estates, a community located approximately three miles from the Lang Property site.

Transport of the contaminated groundwater to the POTW would probably be accomplished by a force main, whereas transport to the other treatment facilities under consideration will require trucking. Off-site treatment will be retained for further evaluation.

Surface Capping

Surface capping at the Lang Property site would prevent contact with the waste by humans or animals entering the site area. However, considering the depth of soil contamination and the shallow water table, isolating the waste from the ground water would require that surface capping be performed in conjunction with the pumping or draining of ground water to a depth greater than that of the contaminated soil.

According to the requirements of the Resource Conservation and Recovery Act (RCRA), final cover of a landfill must be designed and constructed to provide long-term minimization of liquid passage through the closed landfill, function with minimum maintenance, promote drainage and minimize erosion of the cover, accommodate settling and subsidence to maintain the cover's integrity, and have a permeability less than or equal to that of any bottom liner system or natural subsoil. A cap installed at the Lang Property site conforming to these requirements would be inefficient due to the high water table, which averages only about one and one-half feet below ground surface.

Capping is usually done in concert with ground water controls or containment technologies designed to isolate the source of contamination. However, in regard to public health and the environment, removal of the source of contamination is always preferable to capping or any other form of containment. Because much of the contamination at the site is concentrated in the surficial soils, excavation would be both feasible and implement-

able here. Accordingly, capping in conjunction with groundwater control or containment has been determined to be inappropriate for the Lang Property site and so will not be retained for further evaluation.

Surficial Soil Remedial Technologies

Soil Flushing - Soil flushing is achieved by the movement of water or an aqueous solution through the area of contamination and the subsurface collection of the elutriate. High to medium solubility organics can generally be flushed from soil. These include: lower molecular weight phenols and carboxylic acids; low to medium molecular weight ketones, aldehydes, and aromatics; and lower molecular weight halogenated hydrocarbons such as trichloroethene and tetrachloroethene.

Since, however, some classes of contaminants found in the surface soils exhibit strong tendencies to bind to soil particles, soil flushing may not remove all the contamination present. Although subsurface soils would be amenable to soil flushing, the phthalates, phenols, PAH's, and PCB's detected in the surficial soil at the Lang site will be resistant to this process. Thus, if soil flushing is applied, it should be done in conjunction with other remedial technologies.

Excavation and Treatment or Disposal of Contaminated Soils

Excavation - As discussed previously, the surficial soils (0-2 feet deep) are grossly contaminated with volatile organic compounds bound to the organic matter in the soils. Consequently, excavation and removal of the surficial soils would effectively remove most of the source of the contamination at the site.

On-site Treatment - On-site treatment of contaminated surficial soils at the site would involve the excavation and treatment by solidification/stabilization, incineration, or volatilization.

Solidification/Stabilization - Solidification of wastes produces a monolithic block with high structural integrity. The contaminants do not necessarily interact chemically with the solidification reagents, but are mechanically locked within the solified matrix. Solidification/stabilization techniques for treating soil contaminated with organics have not been adequately demonstrated to warrant further consideration as part of the remedy at this site.

On-Site Incineration - Thermal destruction methods have proven to be effective in the destruction of organic contaminants in liquid, gaseous, and solid wastes. Incineration of contaminated soils at the Lang Property site would require that either a

mobile incineration system be brought to the site or an incinerator be constructed on-site. The small volume of soils to be incinerated at the site would make construction of an incineration system at the site uneconomical. Mobile incineration systems require that the feed stream be homogeneous and fine-grained.

Surficial soils at the site are littered with debris and many areas have relatively thick vegetative cover. The reduction of these soils to a fine-grained consistency would be costly. In addition, ash from the incineration process would require removal and off-site disposal. Thus, the surficial soils at the Lang Property Site do not seem well suited to on-site incineration.

Volatilization - Volatilization can be accomplished through thermal treatment or mechanical aeration. The direct heat rotary dryer is a proven thermal treatment unit and has been used for many years by the asphalt industry. Because this unit is best suited for use with free flowing granular solids, the presence of debris and bulk materials scattered throughout the Lang Property site would complicate the operation of such a system.

Mechanical aeration has also been used to enhance the removal of volatile organic contaminants from soils. Excavation of contaminated soils, followed by land spreading and mechanical agitation with machinery similar to a rototiller, is the simplest approach. Mechanical aeration is most effective when used on dry granular soils, since moisture or a high clay content may hamper volatilization.

Air emissions from either a thermal treatment or a mechanical aeration process would have to meet applicable Federal and State regulations. A major shortcoming of both these processes is the inability to treat non-volatile organic contaminants and inorganic contaminants. Thus, if volatilization is implemented, the soils would receive only partial treatment and so would require further off-site treatment or landfill disposal. Based on these considerations, volatilization was eliminated from further consideration.

On-site Disposal

On-site disposal of contaminated soils and sludges generated by excavation of contaminated material, or by an on-site treatment or pretreatment process, requires the construction of a secured landfill that meets RCRA and State requirements. Several criteria are associated with the construction of a RCRA hazardous waste landfill, including the following:

- The landfill should be designed so that the local ground water table will not be in contact with the facility.
- The landfill should be constructed of, or lined with, natural or synthetic material of low permeability to inhibit leachate migration.
- An impermeable cover is required to minimize infiltration and leachate production.
- A leachate and runoff collection system must be provided.
- Periodic monitoring of surface water, ground water, and soils adjacent to the facility must be conducted to determine the integrity of the liner and leachate collection system.

At the Lang Property site, construction of a landfill meeting these requirements would be impractical due to the high water table and the uncompacted, highly permeable sands underlying the site. These conditions preclude the need for further evaluation of this technology.

Off-Site Treatment or Disposal of Contaminated Soils

Off-site treatment or disposal consists of the removal of surficial soils and transport to an off-site landfill or incineration facility. Discussions with several incineration facilities have indicated that this is a viable option, although costly. An important consideration in the evaluation of any off-site treatment or disposal technology is the need for compliance with the EPA's Off-Site Policy. A potential constraint in implementing a remedial alternative involving off-site disposal or incineration could be in locating facilities that are in compliance with the Off-Site Policy. However, this technology was retained for a detailed evaluation.

Effluent Discharge

Extracted groundwater can be discharged to a surface water body, discharged to a POTW, or reinjected into the ground. The last two alternatives are discussed extensively in the Description of Alternatives section below.

Discharge to Surface Water - Discharge of an on-site treatment process effluent to a surface water body is rendered impractical by the lack of an adequate receiving water body in the area. A review of topographic maps of the area indicated that all streams within a three-mile radius are unsuitable for surface water discharges because of extremely low flow rates, particularly during dry conditions. Three miles was chosen as the distance for consideration because that is the distance to the nearest sanitary sewer system, which is a comparable alternative.

VII. APPLICABLE FEDERAL AND STATE CRITERIA AND STANDARDS

Applicable Standards

Applicable or relevant and appropriate requirements were reviewed in preparation for evaluation of contaminated ground water treatment and disposal aspects of remedial alternatives. The applicable standards and criteria for chemicals detected at above-background concentrations in on-site samples of contaminated ground water are presented in Table 8. Although the list of indicator chemicals consists exclusively of organic compounds, the inorganic compounds detected in on-site groundwater and included in Table 8 are given full consideration with respect to establishment of effluent criteria for contaminated groundwater treatment systems.

Federal Standards

Columns 1 and 2 of Table 8 list the Primary and Secondary Drinking Water Standards as defined in the Federal Safe Drinking Water Act of 1974 (PL 93-523), which was amended in 1977. These standards define water quality criteria for public drinking water supplies as per 40 CFR 141 and 143 of the Safe Drinking Water Act. The primary standards address health considerations, while the secondary standards reflect aesthetic qualities (i.e., odor, taste, etc).

The recommended maximum contaminant levels (RMCL's) and maximum contaminant levels (MCL's) in Columns 3 and 4 were developed to specify concentrations of volatile organics in drinking water which would result in no known or anticipated adverse health effects. An MCL represents the allowable lifetime exposure to a contaminant for a 70-kilogram adult who consumes two liters (0.53 gallons) of water per day. MCL's are established to achieve health goals while considering practical limitations (such as treatment technology, economics, and detection limits) while RMCL's are based exclusively on health considerations without regard for technical considerations. For this reason, MCL's are considered enforceable standards and RMCL's are considered nonenforceable. Consequently, for establishing discharge limitations, MCL's have been determined to be applicable, relevant and appropriate, while RMCL's are not considered.

Proposed RMCL's and MCL's were published in the Federal Register in November 1985 but have yet to be finalized by EPA. Proposed MCL's are not listed because, as discussed above, they are not and will not be enforceable and hence are considered inappropriate. Columns 5 and 6 list Federal Ambient Water Quality Criteria developed by EPA's Office of Water Planning and Standards, Division of Criteria and Standards. These values are from individual documents which represent refinements of the initial criteria. Maintaining contaminant levels below these values will result in the following:

TABLE 8

REMEDIATION CRITERIA

	Safe Drinking Water Act				Proposed Water Quality Criteria Cancer Risk		NJPDES Toxic Effluent Limitations For Permit Potable Water		NJDEP Proposed Drinking Water Guidelines	NJDEP Div. Of Water Resources - Current Policy For Ground Water Cleanup (See #1 Below)	NJ State Groundwater Standards GW I	Central Pine Barrens Water Quality Standards Groundwater
					Canc. Risk		Canc. Risk					
Column:	Prim. (1)	Sec. (2)	MCL (3)	PMCL (4)	10^{-6} (5)	Tox. (6)	10^{-6} (7)	Tox. (8)	(9)	(10)	(11)	(12)
Methylene Chloride					0.19				4.8	5		
1,1-Dichloroethene							0.033		7.0	5		
1,1-Dichloroethane			5	5	0.033					5		
Trans-1,2-Dichloroethene				70						5		
1,1,1-Trichloroethane			200	200		18,400		18,400	27	5		
Trichloroethene			5	5	2.7		2.7		20	See Below-1a		
Benzene			5	5	0.66		.0.66		3.1	5		
Tetrachloroethene			5		0.8		0.8		0.68	5		
Toluene						14,300		14,300	0.67	5		
Ethylbenzene						1,400		1,400		See Below-1a		
Total Xylenes										See Below-1a		
1,4-Dichlorobenzene			750	750		400		400		See Below-1a		
1,2-Dichloropropane												
Isophorone						5,200		5,200		See Below-1a		
2,4-Dimethylphenol						400						
Bis(2-Ethylhexyl)Phthalate						15,000				5		
Barium	1,000									5		
Cadmium	10					10		10			1,000	1,000
Chromium						50					NBG	NBG
Copper		1,000				1,000					NBG	
Iron		300									1,000	1,000
Lead	50					50		50			300	300
Nickel						13.4		13.4			50	NBG
Sodium												
Zinc		5,000				5,000					10,000	10,000
											5,000	5,000

Notes: 1) Additional standards for the following were based on information provided to EPA by NJDEP with regard to another NPL site with comparable contamination problems in the Pinelands. These standards were reported by NJDEP staff to reflect current departmental policy.
a) Total priority pollutant volatile organics < 50 ppb
b) Individual carcinogens < 5 ppb
c) Total ketones < 100 ppb
2) All criteria are presented in ug/l
3) NHG = Natural Background

- Less than one additional cancer case per 1 million exposed persons (10^{-6} risk level) for carcinogenic chemicals (column 5)

- No adverse noncarcinogenic health effects. These toxicity values establish a concentration that corresponds to the threshold level for noncarcinogenic chemicals (column 6).

State Standards

Columns 7 and 8 of Table 8 represent the New Jersey Pollution Discharge Elimination System (NJPDES) permit limitations for toxic effluents for the protection of potable water. These maximum values are presented in terms of the 10^{-6} risk level for carcinogenic chemicals (column 7) and in terms of the threshold toxicity level for noncarcinogenic chemicals (column 8). Column 9 represents New Jersey Department of Environmental Protection (NJDEP) Drinking Water Guidelines. These standards are based on recommended limits of 5 ug/l (micrograms per liter) for individual organic chemicals and 50 ug/l for all priority pollutant volatile organic chemicals present.

Column 10 presents New Jersey State Ground Water Standards for ground water classified as GW 1, the designation for the aquifers beneath the Lang Property site. Column 11 presents ground water quality standards for the Central Pine Barrens as established by NJDEP.

Additional Guidelines

Several of the contaminants identified are critical to treatment system design but have no established Federal or State standards for comparison. Accordingly, recommended limitations were developed based on information provided to EPA by NJDEP with regard to another Superfund site located in the Pinelands with comparable contamination. These recommended limitations are presented as footnotes to Tables 8 and 9.

Standards Relative To Type of Discharge

Discharge To Groundwater

Contaminant limitations in effluents discharged to ground water vary depending on the classification of the receiving ground water. EPA's Ground Water Protection Strategy provides general guidance rather than specific groundwater criteria. This strategy separates ground water into Classes 1, 2, and 3. The ground water in the vicinity of the site, being located in the Central Pine Barrens Critical Area, falls within Class 1 (Special

Ground Water), which includes those aquifers that are highly vulnerable to contamination and either irreplacable or ecologically vital sources of drinking water. EPA Region II has advised that ground water discharges in this vicinity should be treated to attain Federal drinking water quality standards. However, if the natural background concentration of a compound is higher than the Federal drinking water standard, the compound shall be treated to natural background concentration.

Similarly, NJDEP divides the State's ground water into Classes GW 1, GW 2, GW 3, and GW 4. GW 1, the classification for ground water at and around Lang Property, has the most stringent water quality criteria, which are presented in column 11 of Table 8. According to NJDEP, "Class GW 1 ground water in the Pine Barrens shall be suitable for potable water supply, agricultural water supply, continual replenishment of surface waters in the Central Pine Barrens, and other reasonable uses" [N.J.S.A. 7:9-6.5(f)]. In addition, NJDEP policy states: "Existing and potential uses of groundwater shall be maintained and protected" [N.J.S.A. 7:9-6.4(c)]. Hence, since one of the potential uses of Class GW 1 ground water is as a potable water supply and it is the policy of NJDEP to maintain and protect potential ground water uses, all discharges to ground water in this area must meet the applicable drinking water standards. Establishment of actual discharge limitations are considered by NJDEP on a case by case basis. Central Pine Barrens Water Quality Standards for ground water within the Pinelands are presented in column 12 of Table 8.

Discharge limitations for the pollutants detected in on-site ground water based on the standards listed in Table 8 are presented in Table 9. The limits based on Federal, State and local drinking water and groundwater quality criteria are intended to produce an effluent that exceeds all applicable and relevant or appropriate public health and environmental requirements.

Discharge To Surface Waters

Contaminant limitations in effluent discharges to surface waters vary depending upon the classification of the receiving surface water. The surface waters near Lang Property are classified by NJDEP as FW-1 and as such are considered nondegradation waters. According to NJDEP policy, the quality of nondegradation waters "shall be maintained as to quality in their natural state (set aside for posterity) and shall not be subject to any man-made wastewater discharge" (N.J.S.A. 7:9-4.5). This policy is not subject to variance or waivers. In addition, the New Jersey Pinelands Comprehensive Management Plan states repeatedly that the Pinelands Commission's policy is to prohibit direct discharges into surface waters.

TABLE 9

LANG PROPERTY GROUNDWATER DISCHARGE LIMITATIONS

	Background Groundwater Quality		Limitations Based on Federal Water Quality Standards		Limitations Based on Federal, State and Local Water Quality Standards	
	Background Conc. (ug/l)	Data Source (Well No.)	Limitation (ug/l)	Data Source (Column in Table 3-1)	Limitation (ug/l)	Data Source (Column in Table 3-1)
Methylene Chloride	<10.0	5-S	0.19	5	0.19	5
1,1-Dichloroethene	<5.0	8-S	*	*	0.033	7
1,1-Dichloroethane	<5.0	8-S	0.033	5	0.033	5
Trans-1,2-Dichloroethene	<5.0	8-S	70.0	4	5.0	10
1,1,1-Trichloroethane	<5.0	8-S	200.0	3,4	See Below-1a	10
Trichloroethene	<5.0	8-S	2.7	5	2.7	5,7
Benzene	<5.0	8-S	0.66	5	0.66	5,7
Tetrachloroethene	<5.0	8-S	0.8	5	0.8	5,7
Toluene	<5.0	5-S	14,300	6	See Below-1a	10
Ethylbenzene	<5.0	8-S	1,400	6	See Below-1a	10
1,4-Dichlorobenzene	<20.0	8-S	400.0	6	400.0	6,8
Isophorone	<20.0	8-S	5,200.0	6	5,200.0	6,8
2,4-Dimethylphenol	<20.0	8-S	400.0	6	400.0	6
Bis(2-Ethylhexyl)Phthalate	<20.0	7S-1,7S-2	15,000.0	6	5.0	10
Barium	20.0	7S-1,7S-2	1,000.0	1	1,000.0	1,11,12
Cadmium	<1.9	8-S	10.0	1,6	NBG	11,12
Chromium	11.0	7S-1,7S-2	50.0	6	NBG	11
Copper	<4.5	8-S	1,000.0	2,6	1,000.0	2,6,11,12
Iron	10,300.0	8-S	300.0	2	300.0**	2,11,12
Lead	<1.7	5-S	50.0	1,6	50.0 or NBG	1,6,8,11,12
Nickel	<5.0	8-S	13.4	6	13.4	6,8
Sodium	4,100.0	8-S	*	*	10,000.0**	11,12
Zinc	59.0	3-S	5,000.0	2,6	5,000.0	2,6,11,12

Notes: 1) Additional standards for the following were based on information provided to EPA by NJDEP with regard to another NPL site with comparable contamination problems in the Pinelands:
a) Total priority pollutant volatile organics < 50 ppb
b) Carcinogens < 5 ppb
c) Total ketones < 100 ppb

(2) NBG = Natural Background

*No Federal limitations exist for these compounds.

**These contaminants will be treated to NBG concentrations if the NBG concentration is greater than the limitation imposed.

Discharge To A Publicly Owned Treatment Works (POTW)

The nearest waste water collection system to Lang Property is located in Country Lakes Estates, approximately three miles from the site. This system is operated by the Pemberton Township Municipal Utilities Authority (PTMUA) and is served by an activated sludge secondary treatment plant that receives domestic waste water exclusively.

This plant has a design capacity of 2.5 million gallons per day (MGD) and currently operates at 1.5 to 2.0 MGD. The NJPDES permit for the plant's discharge to the north branch of Rancocas Creek specifies discharge limitations for daily discharges of five-day biological oxygen demand (BOD), suspended solids, and total phosphate. The PTMUA also has an NJPDES permit regulating the land application of their sludge. This permit limits the disposal of several metals contained within the POTW's sludge.

Contaminant limitations for discharges to a POTW's collection system depend upon the policy of the POTW regarding non-domestic sewerage system connections. Regulations of the PTMUA require a formal written agreement that establishes specific conditions applicable to each non-domestic sewer user. This agreement is intended to establish acceptable waste characteristics, flow conditions, quantities to be received, costs and conditions applicable to the physical connection, and service charges for conveyance, treatment, and disposal. It is the policy of the PTMUA to consider each application on its merits and to establish specific conditions appropriate for each applicant.

The PTMUA's "Rates, Rules and Regulations" establish maximum limits for five contaminants (all of them metals) detected in on-site ground water samples from Lang Property. A comparison of the PTMUA's limits for these metals with their concentrations in Lang Property ground water indicates that the effluent from the pretreatment system should be acceptable to the POTW.

27 other contaminants detected in the ground water, mostly volatile organics, fall within the category of prohibited wastes, as defined in PTMUA's "Rates, Rules and Regulations". PTMUA's engineer has indicated that each of these contaminants would have to be evaluated in detail to determine its potential effect on (1) the safety of treatment plant operating personnel, (2) the collection and conveyance system, (3) waste water treatment facility operations, and (4) sludge disposal operations. The engineer also expressed concern regarding potential modifications required of PTMUA's Wastewater Treatment Plant NJPDES Permit and Land Application of Residuals NJPDES Permit if pretreated ground water were to be accepted.

A pretreatment system can probably be designed to reduce these contaminants to levels that would not affect PTMUA's waste water treatment plant and sludge disposal operations. The specific requirements of such a pretreatment system will be determined when toxicity tests and mass balance calculations are completed. In the interim, pretreatment will be assumed to consist of three elevated temperature air stripping towers and a coagulation, flocculation, and sedimentation unit.

VIII. DESCRIPTION OF ALTERNATIVES

Remedial strategies for individual contaminated media that have not been removed from consideration were grouped together to form alternatives capable of remediation of the entire site. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that at least one alternative be developed to address each of the following categories:

Category I - Alternatives that attain all applicable or relevant Federal public health or environmental standards, guidance, and advisories.

Category II - Alternatives that exceed all applicable or relevant Federal public health and environmental standards, guidance, and advisories.

Category III - Alternatives that meet the CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protect human health and the environment, but do not attain all applicable or relevant standards.

Category IV - Off-site storage, destruction, treatment, or secure disposal of hazardous substances at a facility approved under the Resource Conservation and Recovery Act (RCRA). Such a facility must also be in compliance with all other applicable EPA standards (e.g., Clean Water Act, Clean Air Act, Toxic Substances Control Act).

Category V - No Action

In accordance with Section 300.68 of the NCP, six alternatives were identified, described and evaluated based on the following criteria:

- Technical criteria: reliability, implementability, operation and maintenance, and safety
- Environmental/public health impacts
- Institutional considerations
- Cost

A ground water monitoring program is a component of every alternative considered, including the no action alternative, and will be implemented to track the effectiveness of the recommended alternative. The no action alternative, in fact, consists only of ground water monitoring.

For all remedial alternatives (except no action), a perimeter fence would be installed surrounding the on-site disposal area to prevent site access. On-site debris (tires, abandoned vehicles, construction waste, etc.) and RI generated waste would be removed from the site. Debris would be removed to a staging area, steam cleaned, and wipe sampled to determine if disposal at a RCRA hazardous waste landfill is necessary. Vegetation would be removed, reduced to wood chips, and sampled. RCRA landfill disposal is not anticipated for either of these materials and has not been costed.

Another component common to every alternative developed is the excavation and offsite removal of the surficial soil, the volume of which is estimated to be 6500 cubic yards. This soil will be either landfilled or incinerated and its removal is expected to remove the major source of contamination.

With these similarities noted, the evaluations of the alternatives will focus on the differences between them.

Alternative 1

This alternative, shown schematically in Figure 8, involves long-term extraction of ground water with on-site treatment.

Excavation of surficial soil would be accomplished using conventional excavation equipment. A loading and vehicle wash-down pad would be constructed at the site. Vehicle wash water would be conveyed into the on-site treatment facility. In addition, portions of Whitesbog-Pasadena Road and City Line Road leading from the site to U.S. Route 70 would be regraded and a twelve-inch gravel roadbed constructed. These road improvements are necessary to accommodate the volume of truck traffic required for soil removal. Approximately 300 truck loads would be required to remove 6500 cubic yards of contaminated soil. This material would be manifested according to RCRA requirements and transported for incineration and/or landfill disposal at a RCRA approved facility, in accordance with EPA's Off-Site Policy.

A staging area would be constructed for testing and steam cleaning of on-site debris and vegetation. Following decontamination, these materials would most likely be disposed of at a non-hazardous waste disposal facility. Most contaminants detected in the subsurface soils have significantly lower K_{OC} values than

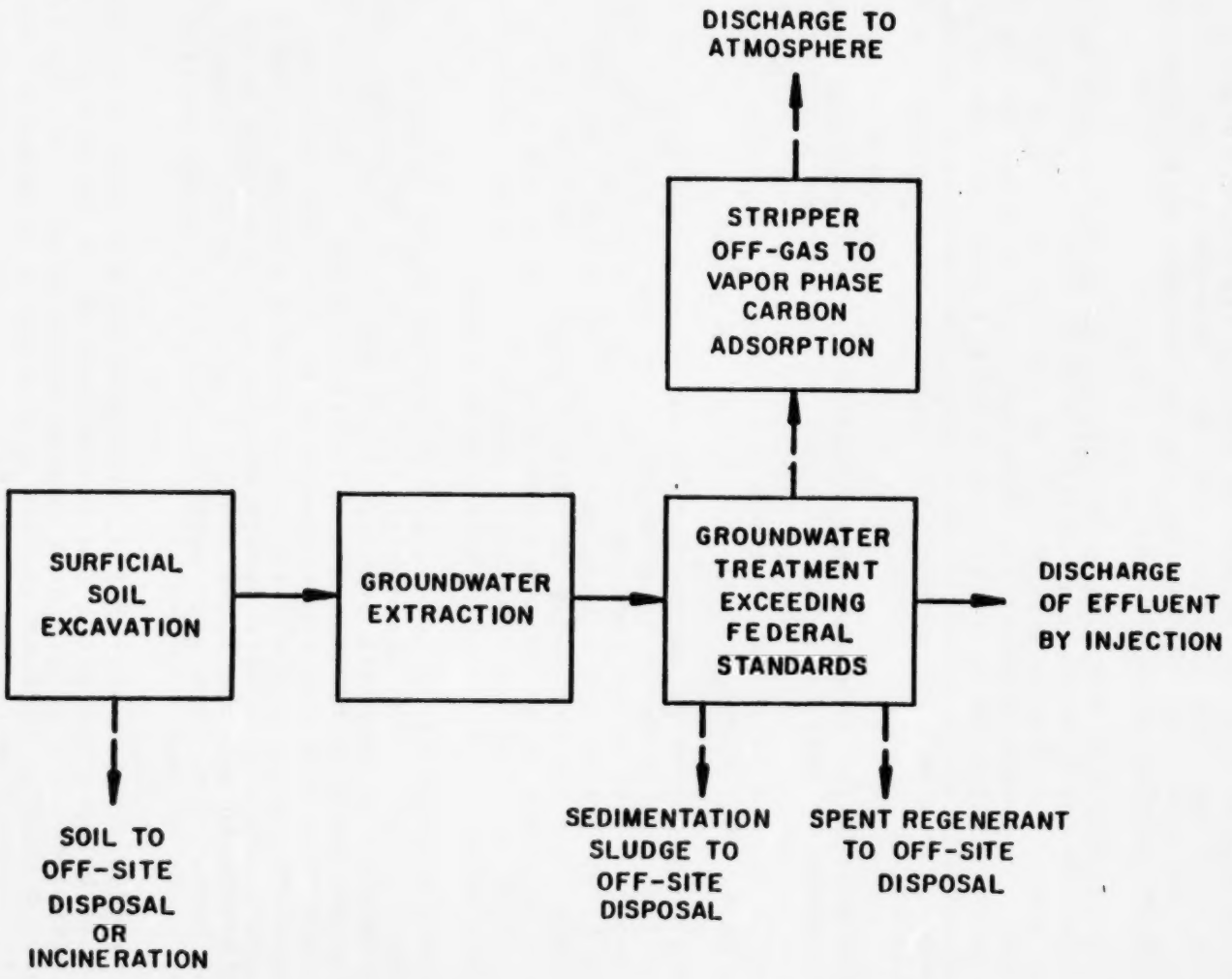
DISCHARGE TO ATMOSPHERE
STRIPPER OFF-GAS TO VAPOR PHASE CARBON ADSORPTION
SURFICIAL SOIL EXCAVATION
GROUNDWATER EXTRACTION
GROUNDWATER TREATMENT EXCEEDING FEDERAL STANDARDS
DISCHARGE OF EFFLUENT BY INJECTION
SOIL TO OFF-SITE DISPOSAL OR INCINERATION
SEDIMENTATION SLUDGE TO OFF-SITE DISPOSAL
SPENT REGENERANT TO OFF-SITE DISPOSAL

FIGURE 8 ALTERNATIVE I

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contaminants detected in the surficial soils alone. Considering the lack of organic matter in the subsurface soils, this suggests that subsurface soil contamination can be removed via flushing as the ground water is removed. When contaminant levels in the extracted ground water approach the treatment process effluent discharge standards, it can be assumed that contamination in the soil has been similarly reduced. Pre-design activities will be conducted to confirm that subsurface soil contamination can be reduced by flushing.

The preliminary design for the ground water extraction system is based on two four-inch ID wells, 30 feet deep, each operating at 20 gpm. The system design will be refined based upon the aquifer test and computer modelling results. Contaminated ground water would be piped to an on-site treatment system consisting of air stripping, coagulation, flocculation, sedimentation, carbon adsorption, and ion exchange followed by pH adjustment by lime addition.

The RI results indicate no contamination in the ground water accessed by on-site wells screened at intermediate depths (30-40 feet). With this in mind, the ground water extraction wells should be screened above this depth. The exact depth will be determined during pre-design activities.

The contaminant plume has an estimated volume of 10 million gallons. This estimate considers soil porosity and assumes a 30-foot depth of contamination. To achieve complete remediation of ground water and subsurface soils, it is believed that three times this volume (i.e., 30 million gallons) must be extracted and treated. This estimate was used in the FS and will be revised as necessary following pre-design studies, including leachability testing of contaminated soils.

Off-gases generated by the air strippers would be treated by a vapor phase carbon adsorption system prior to emission. Sludge generated by chemical precipitation, flocculation, and sedimentation would be removed for off-site disposal, along with spent regenerant from the ion exchange unit. Effluent from the treatment process would enter the pumping station wet well. Again, the preliminary design assumes that the water would be distributed to four four-inch ID injection wells screened above 30 feet. Flow into each well would be metered and controlled by globe valves.

The ground water extraction, treatment, and injection system would be operated until the contaminant plume is captured, as determined by the levels of contaminants detected in the extracted ground water. Presumably, the system would be operated for one and one-half years, the time required to remove 30 million gallons

of contaminated ground water. This volume estimate will be confirmed following aquifer and leachability testing performed in conjunction with the ground water extraction system design.

This system, shown schematically in Figure 9, should reduce contaminant concentrations to levels below Federal, State and local drinking water and ground water quality criteria (see Table 9). An onsite treatability study will be included as a pre-design task to generate data required for the treatment system design. Treatment system influent concentrations used for the treatablility study will reflect the highest concentrations detected in any ground water sample during the RI. Actual treatment system influent can be expected to be significantly less concentrated, particularly after the ground water extraction system is in operation. This system is believed to represent the best available technology and should be able to treat effectively the contaminated ground water at the Lang Property site.

With regard to the environmental/public health evaluation, this alternative removes the two major sources of contamination at the site, surficial soil and ground water, to the greatest extent feasible. Thus, the long-term threats to public health and the environment should be eliminated or greatly reduced.

Short-term risks may result from the excavation of surficial soil. The release of volatile organic contaminants and/or fugitive dust into the atmosphere may also occur. These emissions should not present a significant threat to the public health or the environment, but would be monitored nevertheless. Only short-term risks are believed to be associated with transport to an on-site incineration and/or disposal facility of the contaminated soil, sedimentation sludge, and spent ion exchange regenerant. A release of contaminated material could result in public exposure to volatile organics or fugitive dust by dermal contact or inhalation.

Since off-gases generated by the air stripper will be treated by vapor phase carbon adsorption prior to discharge to the atmosphere, it is unlikely that these emissions will present any risks. Atmospheric monitoring near the treatment system would ensure that any volatiles still present would be released at acceptable concentrations.

This alternative reduces the overall long-term threat to public health and the environment to the greatest extent possible and is not expected to cause any significant long-term adverse impacts.

With regard to institutional issues, this alternative would need to comply with the technical requirements of an Underground

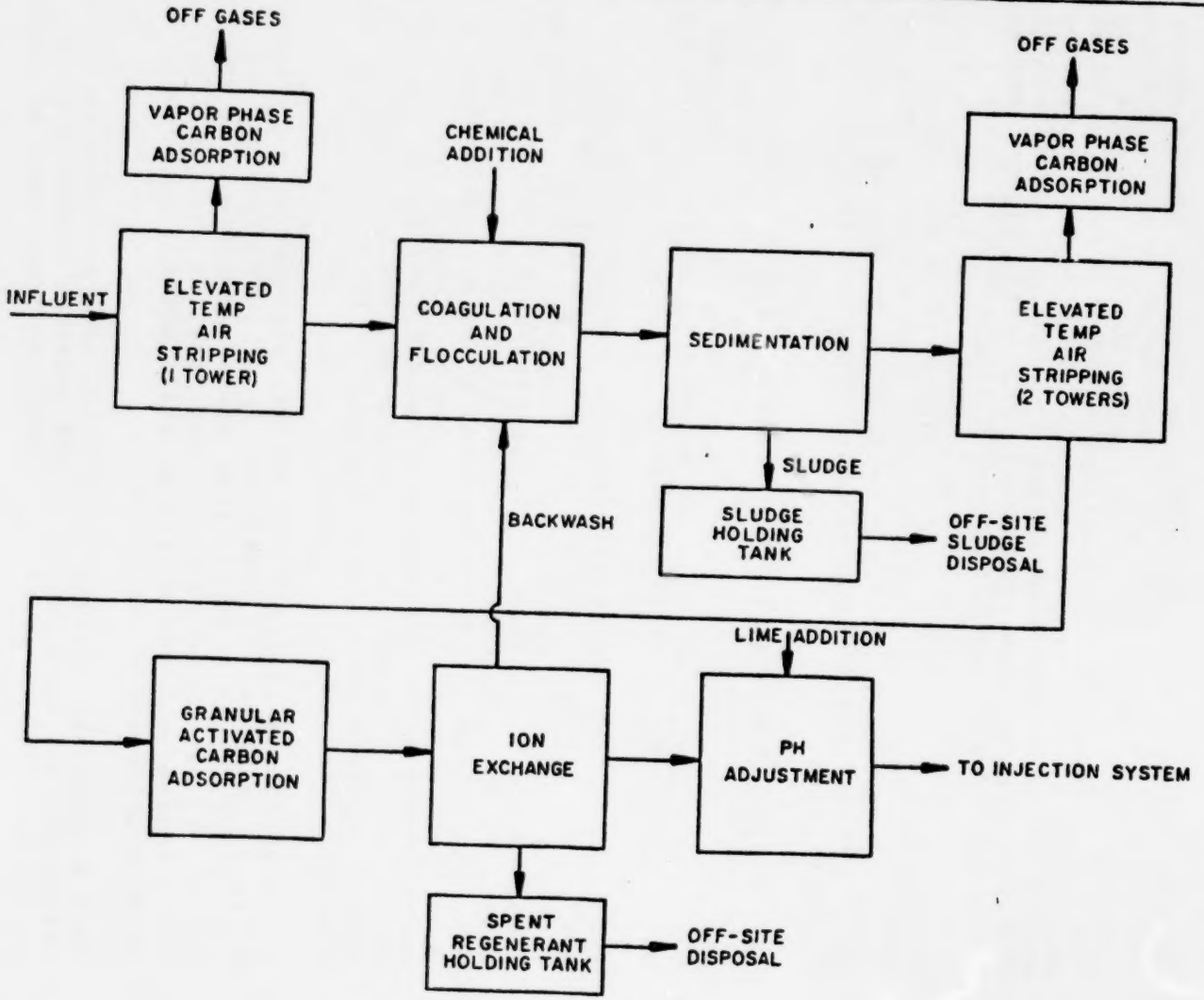

FIGURE 9 ALTERNATIVE REATMENT PROCESS TRAIN

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Injection Control Permit. Extracted ground water would be reinjected into the same aquifer and the quality of the water injected would be equal or superior to that of the aquifer. The on-site treatment plant would be designed to meet the technical requirements of Federal and State air pollution requirements.

Contaminated surficial soil, sludge from the sedimentation process, and the spent ion exchange regenerant will be disposed of at an approved off-site incineration and/or disposal facility. This facility would require either a RCRA Part A (Interim Status) or RCRA Part B permit and must be in compliance with the EPA's Off-Site Policy. Some inconvenience to surrounding residents may occur during removal operations due to increased truck traffic.

Alternative 2

This alternative, shown schematically in Figure 10, is identical to Alternative 1 except that the on-site treatment facility would not include an ion exchange unit for sodium removal. The process would, however, still include air stripping, coagulation, flocculation, sedimentation, and carbon adsorption. As in Alternative 1, the system would be operated for an estimated one and one-half years to remove three times the estimated quantity of contaminated ground water. This should reduce contamination to levels below the Federal drinking water quality standards presented in Table 9.

The absence of the sodium exchange unit does not significantly affect the reliability or implementability associated with ground water treatment. However, because the sulfuric acid regenerant required for the ion exchange process does not have to be mixed and handled, this system is considered safer than the treatment system discussed for Alternative 1.

With regard to the environmental/public health evaluation, any short-term risks associated with on-site storage and transport of the regenerant are eliminated. Without this unit the treatment process cannot remove the elevated sodium concentrations that were detected in the ground water on-site. However, sodium has minimal public health and environmental significance at the concentrations at which it was measured. Moreover, dilution in the ground water would reduce the concentrations significantly before any surface waters or human receptors would be encountered. Risks associated with the other components of this alternative have already been discussed under Alternative 1.

The institutional constraints imposed by the on-site treatment processes and off-site disposal of contaminated soil and sludge would be the same as those described under Alternative 1.

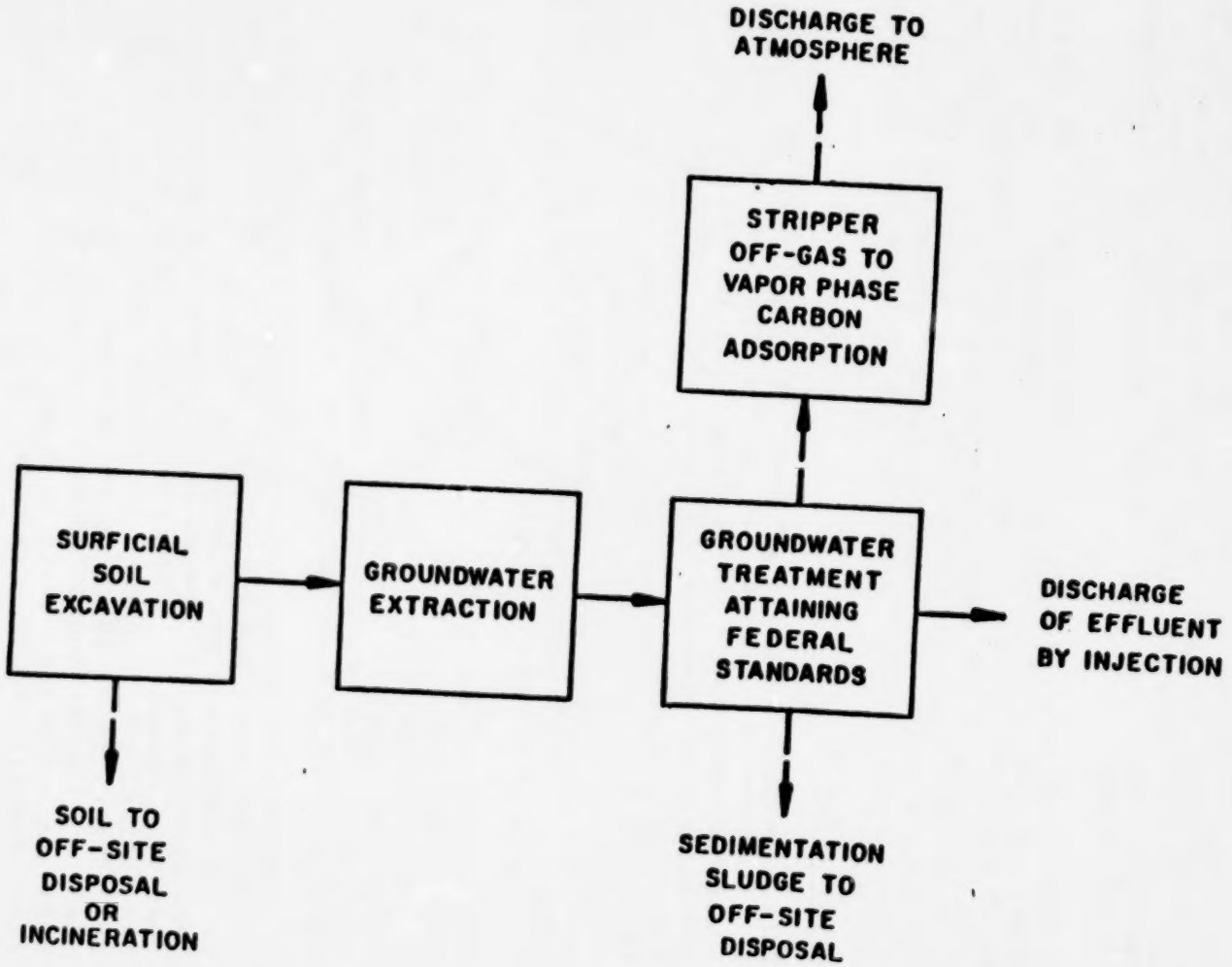
DISCHARGE TO ATMOSPHERE
STRIPPER OFF-GAS TO VAPOR PHASE CARBON ADSORPTION
SURFICIAL SOIL EXCAVATION
GROUNDWATER EXTRACTION
GROUNDWATER TREATMENT ATTAINING FEDERAL STANDARDS
DISCHARGE OF EFFLUENT BY INJECTION
SOIL TO OFF-SITE DISPOSAL OR INCINERATION
SEDIMENTATION SLUDGE TO OFF-SITE DISPOSAL

FIGURE 10 ALTERNATIVE 2

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Alternative 3

This alternative, shown schematically in Figure 11, involves extraction, on-site pretreatment and discharge of ground water to the Pemberton Township Municipal Utilities Authority (PTMUA) waste water treatment plant. These components replace the on-site treatment and reinjection of ground water described for Alternatives 1 and 2. The ground water extraction system is the same as that described above.

Extracted ground water would be pretreated on-site. The extent of pretreatment will be determined following toxicity testing and mass balance calculations. Effluent from this process would be discharged to the PTMUA trunk sewer or pump station servicing Country Lakes Estates. An on-site pumping station and pipeline would be constructed to transport the effluent to the PTMUA plant, three miles away.

The proposed force main would run from the Lang Property along the abandoned Penn Central Railroad right-of-way that passes south of the site, as shown in Figure 12. As in Alternatives 1 and 2, the system would extract and treat a sufficient quantity of contaminated ground water to reduce contamination levels below the Federal drinking water quality standards presented in Table 9.

The ground water pumping, on-site surficial soil excavation, and off-site incineration and/or disposal portions of this alternative are identical to those discussed in the evaluations of Alternatives 1 and 2. Consequently, the evaluation of technical considerations is also the same.

Toxicity testing and mass balance calculations are being conducted to provide a preliminary determination of the compatibility of the Lang Property waste stream with the POTW treatment process. Presumably, pretreatment will consist of three elevated temperature air stripping towers and coagulation, flocculation, and sedimentation. All system components have proven reliability.

The system required to convey pretreated effluent from the on-site pretreatment system to the POTW will consist of a small pump station and a three-mile force main to the PTMUA sewerage system. Such conveyance systems have been used extensively in a variety of applications and are considered very reliable. Implementation of the pipe is along an abandoned railroad right-of-way.

Regarding the environmental/public health evaluation, this alternative also removes the sources of contamination to the same extent of any of the alternatives previously considered. Accordingly, the long-term threats to public health and the environment are likewise reduced. As with Alternative 1, some short-term risks to public health may result from the on-site pretreatment of groundwater and excavation of surficial soil.

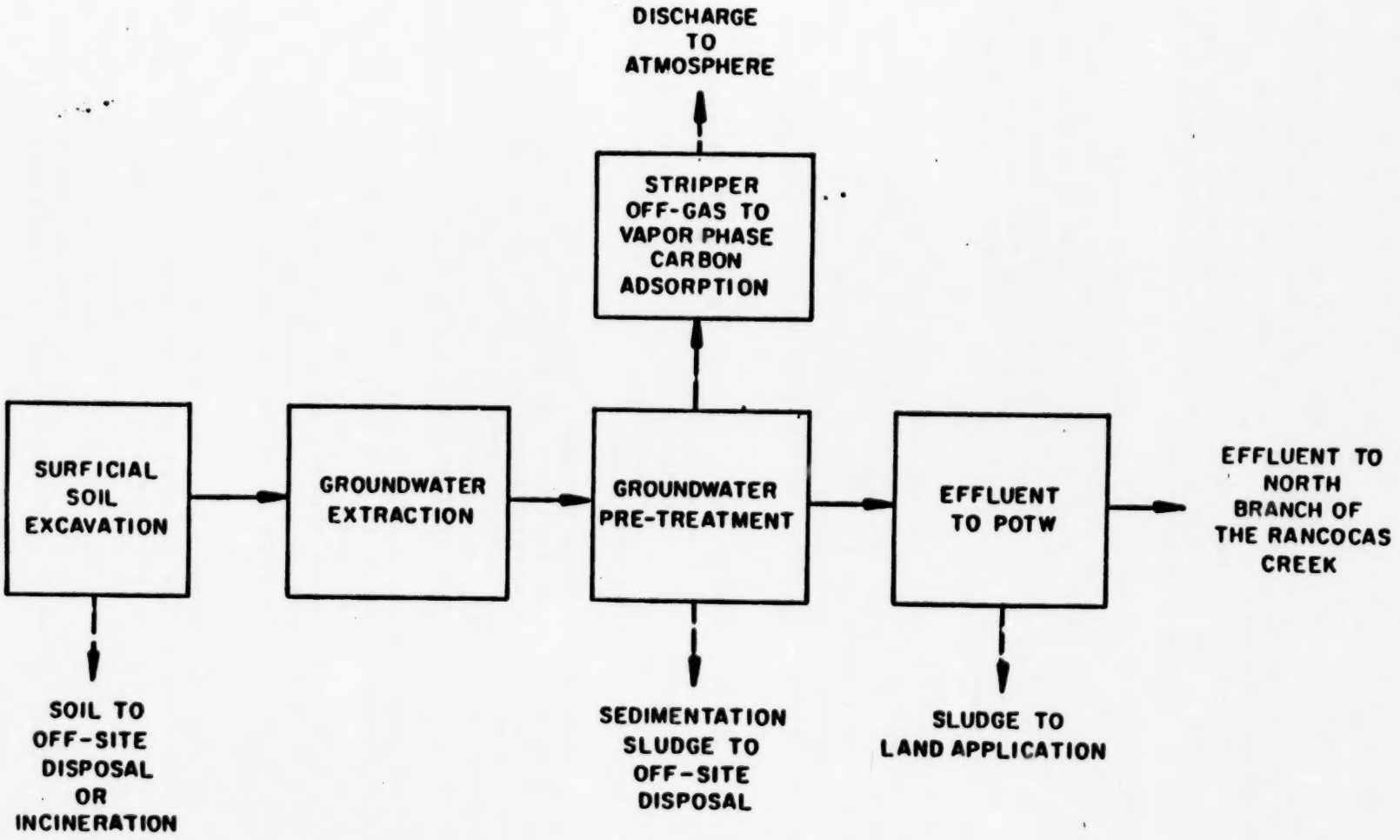
DISCHARGE TO ATMOSPHERE
STRIPPER OFF-GAS TO VAPOR PHASE CARBON ADSORPTION
SURFICIAL SOIL EXCAVATION
GROUNDWATER EXTRACTION
GROUNDWATER PRE-TREATMENT
EFFLUENT TO POTW
EFFLUENT TO NORTH BRANCH OF THE RANCOCAS CREEK
SOIL TO OFF-SITE DISPOSAL OR INCINERATION
SEDIMENTATION SLUDGE TO OFF-SITE DISPOSAL
SLUDGE TO LAND APPLICATION

FIGURE 11 ALTERNATIVE 3

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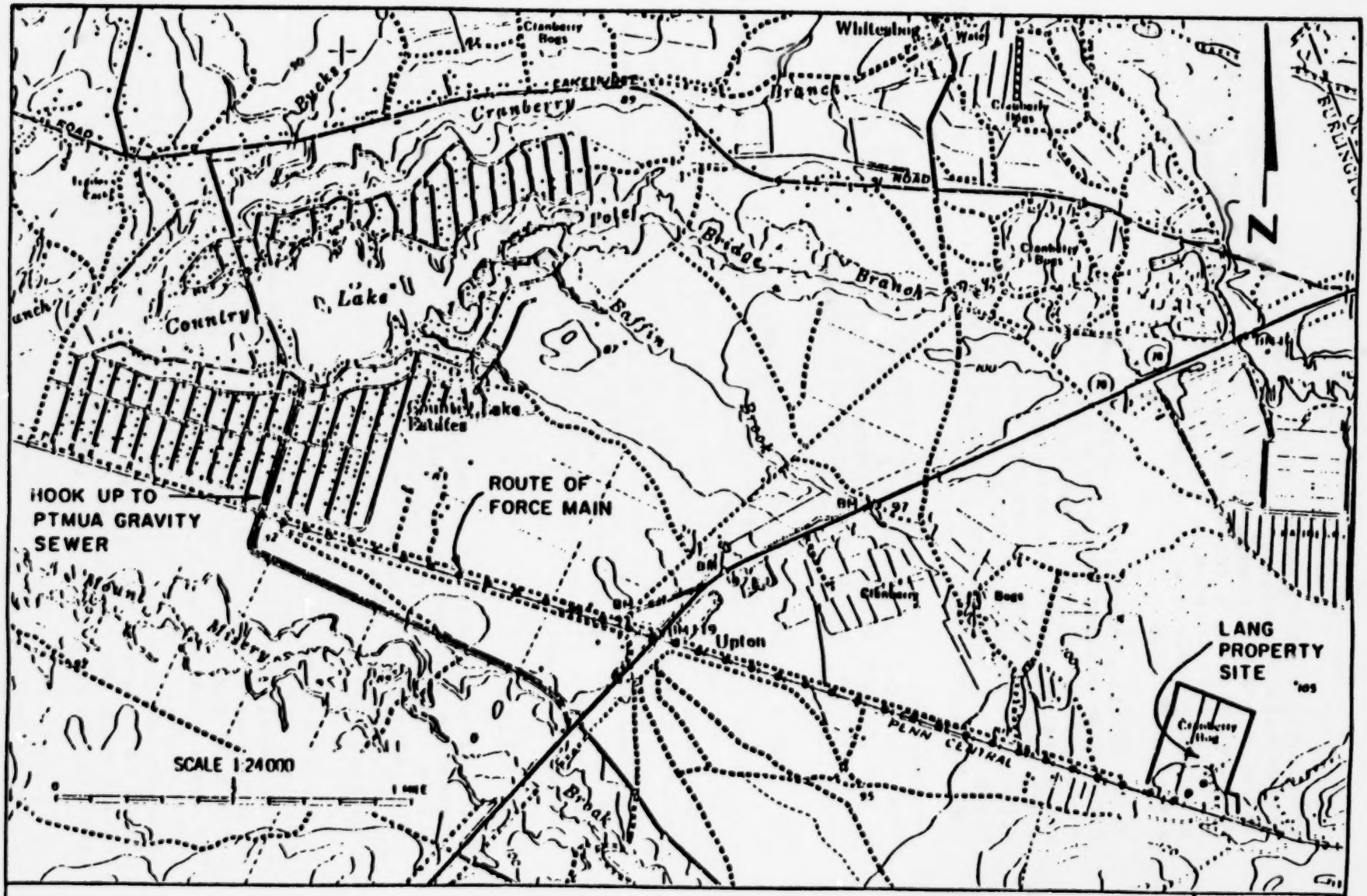

FIGURE 12 ROUTE OF FORCE MAIN TO PTMUA SANITARY SEWER SYSTEM

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Pretreatment would ensure that of the influent to the PTMUA system will not significantly impact POTW operations. Accordingly, the PTMUA treatment plant effluent discharge and sludge disposal practices should not be affected, nor should the environmental impacts of these practices increase. Moreover, effluent discharge will occur outside the environmentally sensitive Pinelands.

Since volatile organic contaminant concentrations should be significantly reduced by on-site pretreatment, no serious adverse environmental or public health impacts due to emissions of gases are expected during transmission of the discharge through the PTMUA gravity sewer. Periodic pressure testing and proper operation and maintenance of the force main should minimize any risks to the environment presented by the possibility of leakage from the force main.

Construction of the force main through the Pinelands may produce some short-term environmental impacts. However, the possibility of significant adverse environmental effects is reduced by the presence of an abandoned Penn Central Railroad right-of-way along the construction route.

With regard to institutional considerations, the excavated surficial soil must be transporated and disposed of in accordance with EPA's Off-Site Policy. Disposal of pretreated ground water to the POTW may require imposition of additional regulatory requirements by NJDEP through alteration of their NJPDES and sludge application permits. The future ability of the POTW's sanitary system to dispose of its sludge by landspreading must be addressed and agreed to by PTMUA and the regulatory agencies involved. The PTMUA has expressed serious concern about discharge of site effluent to their plant and have resisted similar plans in the past.

Alternative 4

This alternative, shown schematically in Figure 13, differs from Alternative 1 in two major ways. The groundwater volume extracted will be only 10 million gallons (the estimated volume of the contaminant plume) instead of 30 million gallons. In addition, the ground water extracted will be transported to an off-site treatment facility for disposal.

Extracted ground water would be pumped to a storage and loading facility. This facility would have a storage capacity of approximately 180,000 gallons to accommodate the total quantity of ground water extracted during three days of operation (2 wells x 20 gpm/well x 1440 min/day x 3 days = 172,800 gallons). The loading facility would be capable of loading two trucks simultaneously. Seventeen tanker trucks of contaminated ground water would leave the site each day, five days a week. The ground water would have to be manifested according to RCRA requirements and transported to a RCRA approved treatment facility, in accordance with EPA's Off-Site Policy.

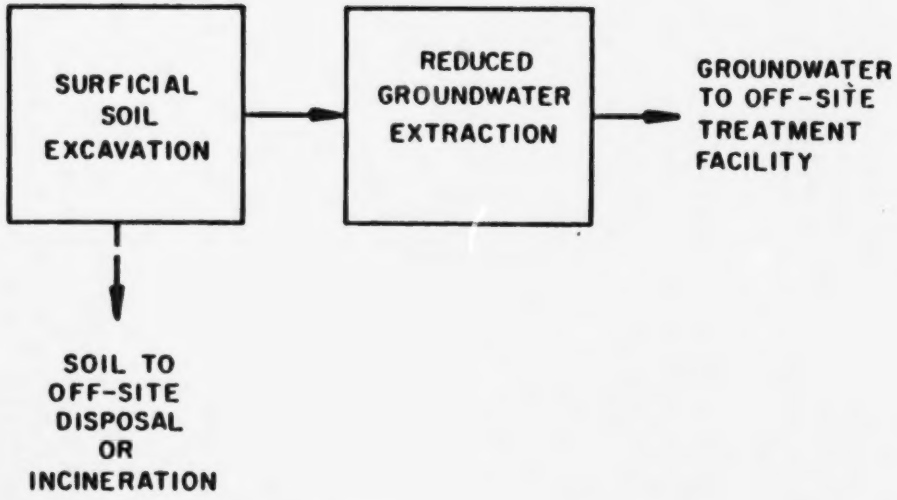
SURFICIAL SOIL EXCAVATION
REDUCED GROUNDWATER EXTRACTION
GROUNDWATER TO OFF-SITE TREATMENT FACILITY
SOIL TO OFF-SITE DISPOSAL OR INCINERATION

FIGURE 13 ALTERNATIVE 4

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Unlike Alternatives 1, 2, and 3, this system would be operated for approximately six months and remove 10 million gallons of contaminated ground water from the site. This volume reduction would lessen the potential impacts to public health and the environment associated with the site. It is unlikely, however, that this alternative would reduce contamination levels in the ground water to below Federal drinking water quality standards. Extraction well pumps would be shut down periodically to allow flushing of subsurface soils within the cones of depression of the extraction wells.

The ground water extraction system used in this alternative is identical that described for Alternatives 1, 2, and 3. Consequently, the reliability, implementability, and safety aspects associated with it would be the same as those discussed for the other alternatives.

In this alternative, on-site treatment is replaced by hauling the contaminated ground water to an approved off-site treatment facility. The simplicity of this system, consisting of ground water storage and loading facilities, makes it highly reliable. Implementability of this portion of the alternative is considered moderate, requiring the construction of storage and truck loading facilities with a total capacity of 180,000 gallons. The safety factor associated with storage, loading, and hauling of contaminated groundwater is considered acceptable. Hazardous materials are routinely loaded and hauled in various industries. In addition, as ground water pumping continues, that contaminant concentrations are expected to decrease.

Technical aspects of on-site surficial soil removal are the same as those outlined for the three alternatives already discussed. Therefore, reliability and acceptability of off-site surficial soil removal are high for this alternative, while safety is considered acceptable. The high reliability is mainly due to the absence of a complex on-site treatment system.

As far as the environmental/public health evaluation is concerned, this alternative will significantly reduce the long-term threats to public health and the environment posed by the site. Except for Alternative 6 (the no action alternative), however, it does not remove contamination from the subsurface soil to the extent of the other alternatives. Residual contamination may remain in the subsurface soil and continue to be a source of ground water contamination. The extent to which contamination will remain in the subsurface soil is difficult to determine. The distant downstream location of the nearest receptor suggests that residual contamination will be significantly diluted before reaching a receptor. Thus, the threats to public health and welfare should be reduced to an extent comparable to the other alteratives. Environmental risks associated with the site, however, would not be reduced as much, since residual contamination may remain in the subsurface soils.

The on-site handling, storage, and off-site transport of the ground water for treatment, as well as the excavation and transport of contaminated soils, will present minor short-term risks to public health and the environment. A release of contaminated soil or ground water, as previously discussed, could result in exposure of the public to volatile organics or fugitive dust by dermal contact or inhalation. An environmental advantage of this alternative is that is does not involve a discharge of treated ground water within the Pinelands area. Untreated contaminated ground water withdrawn from the site and excavated surficial soils must be treated or disposed of at an approved treatment or disposal facility. Any such facility must operate under either a RCRA Part A (Interim Status) or RCRA Part B permit and must be in compliance with the EPA's Off-Site Policy. Transporters hauling the contaminated soil and ground water to such facilities would also be required to be permitted under RCRA and to manifest properly all transportation of hazardous waste.

Alternative 5

This alternative, shown schematically in Figure 14, is identical to Alternative 4 except that the ground water would be pumped for one and one-half years instead of one-half year, thus removing three unit volumes of contaminated ground water (30 million gallons) rather than one. As such, the technical aspects of this alternative are identical to those described for Alternative 4. As in Alternatives 1, 2 and 3, this volume of ground water pumping should reduce contamination levels in groundwater below the Federal drinking water quality standards presented in Table 9.

Regarding the environmental/public health evaluation, this alternative reduces the sources of contamination at this site as much as any alternative considered. The environmental/public health evaluation is thus similar to that of Alternative 4, with the exception that this alternative further reduces the threats posed by the site to the environment by eliminating long-term releases of contaminants from the subsurface soils.

The institutional constraints imposed by pumping a larger quantity of contaminated ground water would be the same as described under Alternative 4. From a public perspective, this alternative may meet with more favorable reaction than other alternatives because it involves the removal of all contaminated material from the site for off-site disposal.

Alternative 6

This alternative consists of installing a limited number of monitoring wells and tracking the migration of the contaminated ground water plume to ensure that is does not endanger public health and welfare. This system would have high reliability and implementability. No remedial actions would be performed under this alternative.

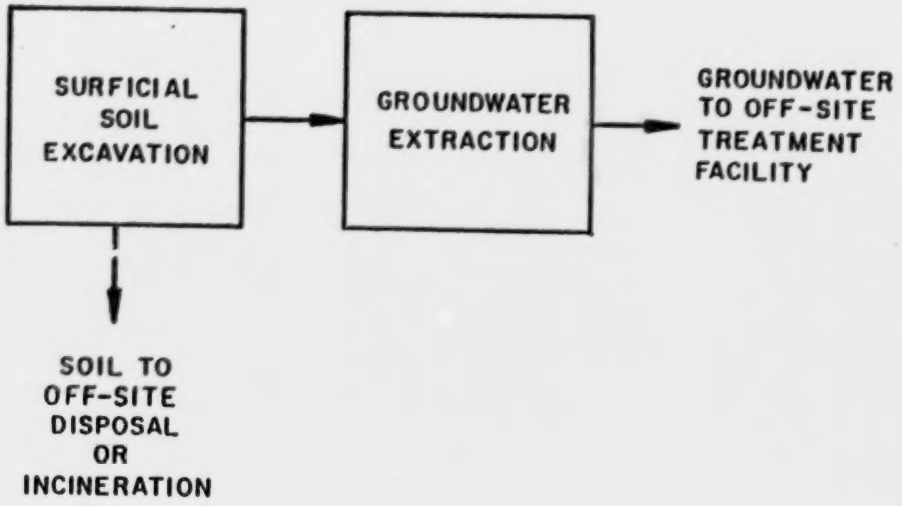
SURFICIAL SOIL EXCAVATION
GROUNDWATER EXTRACTION
GROUNDWATER TO OFF-SITE TREATMENT FACILITY
SOIL TO OFF-SITE DISPOSAL OR INCINERATION

FIGURE 14 ALTERNATIVE 5

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Additional well clusters would be installed downgradient of the site at shallow and intermediate depths. All wells would be sampled annually and analyzed for the full Hazardous Substance List. In addition, six selected wells will be sampled each quarter and analyzed for volatile organics only.

This alternative does not reduce the current threats to public health or the environment. Thus, the major exposure routes associated with the ground water and surficial soil will remain, as will the potential exposure of humans and animals to contaminated surficial soil. This alternative does not meet existing Federal or State standards for mitigation of contamination and relies on the low health risk posed by the present use and remote location of the site.

No permits would be required under this alternative. The major institutional issues would be the adverse responses expected from some members of the Pinelands Commission and members of the community who own agricultural lands adjacent to the site. Because the source of ground water contamination still exists, to take no action at the site would fail to address the perceived endangerment of public health and the environment.

IX. COST EVALUATION OF ALTERNATIVES

Cost estimates for each of the alternatives are presented in Table 10. As discussed earlier, two sets of costs are given for each alternative to address both incineration and landfilling of surficial soils.

The evaluations of the six alternatives are summarized in Table 11. Rankings are presented for technical, environmental/public health aspects and institutional criteria. The costs for each of the alternatives are repeated in this table.

Incineration generally provides complete destruction of wastes and so achieves a more permanent remedy. However, the cost of incineration of surficial soils is estimated to be almost ten times higher than the cost of landfilling these soils.

X. COMMUNITY RELATIONS

The Environmental Protection Agency has conducted numerous community relations activities in regard to the Lang Property site. Throughout the RI/FS, EPA has been in close contact with the Pemberton Township officials, the Burlington County Health Department, the Pinelands Commission and local residents living near the site.

Although community concern is relatively low at the site, residents and local officials expressed a number of concerns during the public scoping meeting held in April 1985, a public meeting in August 1986 to discuss the results of the RI/FS, and the public comment period that extended until September 8, 1986. These concerns dealt with the following issues:

TABLE 10

COST SUMMARY OF REMEDIAL ALTERNATIVES
(1986 dollars)

Alternative	Capital ($1,000)		O&M ($1,000)	Present Worth ($1,000)	
	Incin.[1]	LF[2]		Incin.	LF
1	16,226	2,460	629	17,335[3]	3,570[3]
2	16,088	2,322	612	17,175[3]	3,409[3]
3	16,305	2,539	640	17,428[3]	3,662[3]
4	17,514	3,747	119	17,870[4]	4,103[4]
5	21,237	7,470	119	21,668[3]	7,901[3]
6	9	9	33	325[5]	325[5]

[1] Incin. denotes incineration of surficial soil
[2] LF denotes landfilling
[3] Cost includes operating the system for 18 months and groundwater monitoring for 3 years
[4] Cost includes operating the system for six months and groundwater monitoring for 3 years
[5] Cost includes groundwater monitoring for 3 years.
Note: Costs of incineration and landfilling are considered as capital costs and thus the O&M costs do not vary.

TABLE 11

SUMMARY OF EVALUATION AND COST INFORMATION FOR EACH ALTERNATIVE

	TECHNICAL			ENVIRONMENTAL PUBLIC HEALTH		INSTITUTIONAL		COST($1,000)				
Alternative	Reliability	Implementation	Safety	Public Health Welfare	Environmental	Regulatory Requirements	Perceived Community Attitude	Capital Incin.[1]	Capital LF[2]	O&M	Present Worth Incin.	Present Worth LF
1	medium	low	low	high	high	medium	medium	16,226	2,460	629	17,335[3]	3,570[3]
2	medium	low	medium	high	high	medium	medium	16,088	2,322	612	17,175[3]	3,409[3]
3	high	low	medium	high	high	low	medium	16,305	2,539	640	17,428[3]	3,662[3]
4	high	medium	medium	high	medium	medium	medium	17,514	3,747	119	17,870[4]	4,103[4]
5	high	medium	medium	high	high	medium	high	21,237	7,470	119	21,668[3]	7,901[3]
6	high	high	high	low	low	medium	low	9	9	33	325[5]	325[5]

[1] Incin. denotes incineration of surficial soil
[2] LF denotes landfilling
[3] Cost includes operating the system for 18 months and groundwater monitoring for 3 years
[4] Cost includes operating the system for six months and groundwater monitoring for 3 years
[5] Cost includes groundwater monitoring for 3 years
Note: Costs for incineration and landfilling are considered as capital costs and thus the O&M costs do not vary.

° Nature of contamination

° Environmental standards for remedial cleanup

° Air quality concerns

° Cost and schedule of remedial action

° Potential off-site migration

With regard to specific alternatives, the Pemberton Township Municipal Utilities Authority (PTMUA) has expressed its concerns in detail and stated that it would oppose any alternative that involves discharge to the PTMUA sanitary sewer system (i.e., Alternative 3).

The Pinelands Commission has expressed concern about utilization of the PTMUA. Their comments address the disruption of the Pinelands due to installation of the sewer line, should Alternative 3 be selected.

Other concerns were raised regarding the effect on the Cohansey aquifer should Alternative 4 or 5 be selected, as both involve removal of extracted ground water, rather than reinjection. Finally, the Pinelands Commission has raised a general concern about treatment of ground water to background levels.

As mentioned previously, EPA has responded to all concerns during the public meetings and in the attached Responsiveness Summary. EPA believes the selected remedial alternative adequately addresses the comments and concerns raised by all interested parties.

XI. RECOMMENDED ALTERNATIVE

EPA hereby selects Alternative 2 as the recommended alternative for the Lang Property site. As previously described and illustrated in Figure 10, this alternative comprises the following elements:

- Enclosure of the disposal area by a perimeter fence.

- Excavation of contaminated on-site soils to a depth of two feet (totaling approximately 6500 cubic yards) and removal of these soils to an approved off-site landfill disposal facility.

- Extraction of approximately 30 million gallons of ground water, with treatment and reinjection on-site. Extraction wells will be utilized and the on-site ground water treatment system will consist of air stripping, coagulation, flocculation, sedimentation, and carbon adsorption. Spent regenerant and sedimentation sludge will be disposed of at an off-site landfill facility and air stripper off-gases will

be treated by vapor phase carbon adsorption with eventual discharge to the atmosphere. The treated effluent will be pumped to on-site injection wells.

- Removal of on-site debris (tires, abandoned vehicles) and vegetation to facilitate filling and grading the site in the future.

- Post-construction operation and maintenance to verify the effectiveness of this remedy.

The disposal of contaminated soils by landfilling was chosen instead of incineration due to the excessive costs associated with incineration. In comparison to the other alternatives, Alternative 2 was chosen based on the following:

°Alternative 2 vs. Alternative 1

Alternative 1 would result in remediation that exceeds Federal, State, and local requirements. However, exceeding State and local requirements involves removing sodium, a contaminant which has no public health or environmental significance at the levels found at the site. Removal of sodium would cost approximately an additional $161,000 and the treatment process would create a significant additional waste stream requiring off-site disposal. For these reasons, Alternative 2 was more favorable than Alternative 1.

°Alternative 2 vs Alternative 3

Alternative 3 would involve potential disruption of the PTMUA treatment plant (which currently has no industrial users) by pretreated Lang Property effluent, as well as disruption of the Pinelands by installation of a three-mile force main, which would only be used for one to three years. The additional cost associated with this alternative was approximately $253,000. Finally, significant institutional constraints exist for this alternative in the form of opposition from the PTMUA and the Pinelands Commission. For these reasons, Alternative 2 was deemed more feasible than Alternative 3.

°Alternative 2 vs Alternative 4

Alternative 4 was not designed to attain applicable, relevant and appropriate Federal, State or local requirements. Disruption of the Pinelands from significant truck traffic and the permanent removal of approximately 10 million gallons from the Cohansey Aquifer were of concern, as well. The additional costs associated with implementing this alternative would be approximately $694,000. For these reasons, Alternative 2 was considered preferable to Alternative 4.

°Alternative 2 vs Alternative 5

The permanent removal of approximately 30 million gallons of ground water and the increased disruption of the Pinelands as a result of the greater volume of truck traffic were of critical concern. The additional cost of implementing Alternative 5 would be approximately $4.5 million. For these reasons, Alternative 2 was deemed more appropriate than Alternative 5.

°Alternative 2 vs Alternative 6

Alternative 6 (No Action) would not reduce the public health and environmental endangerment posed by the contaminants at the site in current and future land-use scenarios. For this reason, Alternative 2 was considered more favorable than Alternative 6.

XII. CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

Off-site disposal of contaminated soils will be in a hazardous waste landfill permitted under the Resource Conservation and Recovery Act (RCRA). The ground water beneath the site will be remediated so as to attain applicable, relevant and appropriate Federal public health and environmental requirements. Effluent from the on-site treatment operation will attain Safe Drinking Water Act criteria before being reinjected.

The remedial activities for the selected remedial alternative described are consistent with the technical requirements of State and local environmental laws for all contaminants except sodium, cadmium, chromium, and lead. The levels of cadmium, chromium, and lead will be significantly reduced, however, and the levels of sodium do not appear to be of significant public health or environmental consequence. NJDEP has expressed the opinion that the residual levels of these contaminants will not pose a constraint in implementing the selected remedial alternative.

All air treatment systems employed on-site will comply with the technical requirements of NJAC 7:27-16 and 17.

XIII. OPERATION AND MAINTENANCE (O&M)

Operation and maintenance (O&M) will be required as part of the selected remedial alternative to ensure its effectiveness and reliability. As shown in Table 10, the O&M costs for Alternative 2 are $612,000. These costs include, but are not limited to, ground water monitoring as well as operation and maintenance of the on-site treatment system for the anticipated one and one-half year duration of the ground water extraction.

XIV. SCHEDULE

- 09/86 - Record of Decision approval.
- * - Initiate Pre-Design activities.
- * - Initiate Design activities.
- * - Complete Design activities.
- * - Initiated construction activities.
- * - Complete construction activities.

*Pending CERCLA reauthorization or State funding.

XV. FUTURE ACTIONS

Prior to the design of the selected remedial action at Lang Property, additional work will need to be completed. Additional work recommended includes a treatability study, an aquifer test, a leachability test, and the final delineation of the contaminant plume.

Treatability Study

A treatability study will need to be performed prior to selection of the final design parameters for any on-site treatment or pretreatment system. The treatability study would be conducted on-site by setting up a treatability trailer. The selected treatment train will be set up within the trailer and samples would be collected before and after individual treatment processes. Various options could be evaluated to determine the optimum order of the unit processes. Design parameters would be developed to guide the final design.

Aquifer Testing

A pump test or aquifer test will need to be performed to refine the selected ground water pumping scheme, especially the injection system design. Along with the aquifer test, computer modelling may be utilized, if necessary, to aid in the design of the extraction wells and injection wells.

Leachability Test

A leachability test will be necessary to refine the length of time ground water pumping would be required to adequately remove contamination from the subsurface soils. The leachability test will consist of obtaining subsurface soil samples from the contaminated area and flushing with water to determine the number of pore volumes of water required to remove bound contaminants from the subsurface soil.

Final Delineation of Plume

Prior to designing the ground water extraction system, a final delineation of the contaminant plume will be made. This delineation will allow for proper placement of the extraction wells to ensure that the entire contaminant plume is captured. Additional monitoring wells will probably have to be installed northwest of the leading edge of the plume.

These pre-design activities will be conducted according to the schedule provided, as will the subsequent remedial activities described in this Record of Decision.

FINAL RESPONSIVENESS SUMMARY

TO THE

DRAFT FEASIBILITY STUDY REPORT

LANG PROPERTY SITE
PEMBERTON TOWNSHIP, BURLINGTON COUNTY
NEW JERSEY

Public Comment Period
August 18 to September 8, 1986

From August 18 to September 8, 1986, the U.S. Environmental Protection Agency (EPA) held a public comment period on the draft feasiblity study report on alternatives to clean up hazardous waste contamination at the Lang Property site located in Pemberton Township, Burlington County, New Jersey. This responsiveness summary provides highlights of community involvement and EPA community relations activities at the site during the remedial investigation and feasibility study (RI/FS). In particular, the document summarizes community relations and technical concerns about the draft feasibility study expressed by residents, local officials, and other interested parties.

The responsiveness summary is divided into four sections:

Section A. **BRIEF HISTORY OF THE LANG PROPERTY SITE.** This section provides an overview of the Lang Property site.

Section B. **BACKGROUND ON COMMUNITY INVOLVEMENT AND COMMUNITY RELATIONS ACTIVITIES AT THE LANG PROPERTY SITE.** This section describes community interest in the Lang Property site. In addition, both formal community relations activities and other public involvement at the site during the RI/FS are described.

Section C. **SUMMARY OF QUESTIONS AND COMMENTS RECEIVED BY EPA AND EPA RESPONSES DURING THE PUBLIC COMMENT PERIOD.** This section concisely summarizes key questions and comments voiced by interested residents, State officials, Pinelands Commission staff, local officials, and other interested parties. Questions and comments provided via written and/or verbal communication with EPA about the draft feasibility study are included in this section.

Section D. **SUMMARY OF OUTSTANDING COMMUNITY CONCERNS AND EPA'S RESPONSES.** This section summarizes outstanding community concerns about the remedial alternatives being considered for the site. The concerns are described to assist EPA in planning community relations activities during the remedial design and construction of the selected remedial alternative. In addition, this section includes EPA's responses to these outstanding concerns.

A. **BRIEF HISTORY OF THE LANG PROPERTY SITE.** The Lang Property site covers forty acres of land in a sparsely populated, rural area of the New Jersey Pinelands National Preserve in Pemberton Township, Burlington County. Several residential and agricultural properties are located on City Line Road in the vicinity of the site.

Edward and Florence Lang purchased the Lang property in 1970. In 1975, approximately 1,500 drums containing hazardous wastes were discovered on a two-acre clearing on this property.

The New Jersey Department of Environmental Protection (NJDEP) filed suit against the Langs in September 1975. In December 1975, the Superior Court of New Jersey issued a final order requiring the Langs to remove the hazardous waste, drums, contaminated soil and water from their property and dispose of the materials at an approved disposal facility. Between February and April 1976, the Langs contracted to have the drums and some contaminated soils removed from the site. A series of investigations by NJDEP and the Burlington County Health Department showed that contaminated ground water and soils remained on the site. As part of a Consent Order with NJDEP, the Langs hired a contractor to conduct a ground water study. This study showed that the ground water was significantly contaminated and required further investigation. The site was placed on the National Priorities List in December 1982.

After evaluating and consolidating existing investigation results, EPA began an RI/FS in April 1985 and completed the draft feasibility study in August 1986. EPA held a public comment period on the draft feasibility study from August 18 to September 8, 1986.

B. **BACKGROUND ON COMMUNITY INVOLVEMENT AND COMMUNITY RELATIONS ACTIVITIES AT THE LANG PROPERTY SITE.** Nearby residents living near the site and farmers cultivating blueberries and cranberries in the vicinity of the site initially became aware of hazardous waste on the Lang's property as a result of the lawsuit filed by NJDEP against the Langs in September 1975. Local newspapers described the court action against the Langs. In addition, several newspaper articles focused on concern by nearby residents about potential health effects to people and vegetation from hazardous waste contamination from the site.

Prior to the RI/FS, one farmer, whose wooded property is adjacent to the site and a member of the Pinelands Commission, expressed concern about potential contamination of his cranberry bogs and private drinking water wells in the vicinity of the site. A nearby resident complained that the State was not moving quickly enough to clean up the site. In addition, this resident alleged that a house had been relocated onto the Lang's property. The local solicitor and the Pinelands Commission, which regulates construction in the Pinelands, investigated the construction on the property. (During EPA's initial site visit, in November 1984, EPA found that the structure that had been moved to the site appeared to be unused and uninhabitable.) Meanwhile, the Pinelands Commission, the Burlington County Health Department, and the Pemberton Township Environmental Commission (no longer active) expressed interest and a desire for more information about the Lang Property site.

A community relations plan was prepared for the Lang Property site in January 1985. Although community concern was low at the site, the plan stated that residents and local officials were concerned generally about hazardous waste in the Pinelands and its potential impact on ground water in the area. The plan also noted that local officials believed that most citizens thought that the Lang Property site had been cleaned up or had forgotten that contamination remained at the site.

In April 1985, EPA held a public scoping meeting at the Pemberton Township Municipal Building to provide: (1) an overview of the Superfund program; (2) a background history of the site; and (3) a description of the RI/FS activities. EPA distributed a meeting agenda, a four-page fact sheet which included a detailed site map, and a Superfund Program brochure. Approximately thirty-five people attended the meeting. Participants at the public scoping meeting expressed concerns about the following:

- Potential ground-water and surface-water contamination;
- Nature of contamination at the site;
- Environmental standards and selection criteria for remedial cleanup;
- Sampling methodology, site access, and schedule of activities;
- Economic impact on nearby residential and commercial properties; and
- Information dissemination and community relations activities.

EPA responded to these community questions and concerns at the meeting. A summary of the public meeting was prepared following the session.

The remedial investigation field work was conducted between May 1985 and July 1986. NJDEP visited the site frequently to observe the remedial investigation activities. NJDEP and EPA notified the Burlington County Health Department and the Pinelands Commission staff about the remedial investigation schedule. Representatives from the Burlington County Health Department and the Pinelands Commission staff visited the site to obs erve sampling and ask questions about field techniques and the RI/FS schedule.

Two interested farmers cooperated with EPA during the field activities. One farmer who is currently leasing property from the Langs for blueberry cultivation regularly observed the field tests and informally assisted EPA with security during the remedial investigation by ensuring that the security gate was locked and people did not enter the area. A second farmer who tends cranberry bogs near the site, now a former member of the Pinelands Commission, provided access to his property and allowed EPA to install an upgradient monitoring well to confirm the direction of ground-water flow and collect water quality samples. Both farmers expressed interest in the results of the remedial investigation. In particular, the farmers were interested in the potential contamination of ground water and soils in the vicinity of the site and the impact on vegetation grown in the area.

The Pemberton Township Municipal Utilities Authority (PTMUA) was contacted by EPA and EPA contractors to collect information for an evaluation of a remedial alternative which would involve transporting pretreated waste water from the site for disposal at the PTMUA waste water treatment plant. PTMUA officials contacted EPA prior to the public comment period to express concern about the proposed remedial alternative that included using PTMUA facilities (see page 7 for a description of PTMUA's concern about receiving the pretreated hazardous waste). PTMUA provided data to and has cooperated with EPA during the preparation of the draft feasibility study report.

During the RI/FS, EPA maintained four information repositories in the vicinity of the site. The information repositories included: (1) Pemberton Township Administrator's Office; (2) Pemberton Township Public Library; (3) Burlington County Health Department; and (4) Pinelands Commission.

On August 18, 1986, EPA began its public comment period on the draft feasibility study report. A press release was sent to notify interested citizens about the public comment period and availability of the RI/FS reports in the information repositories. On August 21, 1986, EPA met with the Pinelands Commission staff and the Pemberton Township Municipal Untilities Authority. Although invited by EPA, Burlington County Health Department was unable to attend.

On August 25, 1986, EPA conducted a public meeting at the Pemberton Township Municipal Building. Approximately twenty-two nearby residents, local and county officials, an NJDEP official, and other interested citizens were present at the session. (Attachment A provides a list of meeting participants; Attachment B provides a meeting agenda; and Attachment C provides a fact sheet.) EPA closed its public comment period on September 8, 1986.

C. **SUMMARY OF QUESTIONS AND COMMENTS RECEIVED BY EPA AND EPA RESPONSES DURING THE PUBLIC COMMENT PERIOD ON THE DRAFT FEASIBILITY STUDY REPORT ON THE LANG PROPERTY SITE.** The interested public provided questions and comments to EPA on the Lang Property site draft feasibility study report during the public comment period. Written comments were submitted by the following interested parties:

- o New Jersey Department of Environmental Protection;
- o Pinelands Commission; and
- o Pemberton Township Municipal Utilities Authority.

Approximately twelve individuals including Pemberton Township officials and residents provided verbal questions and/or comments at the pubic meeting.

Questions and concerns about the Lang Property site draft feasibility study are summarized in the following categories:

- o Remedial alternatives;
- o Standards for cleanup;
- o Air quality concerns;
- o Potential migration of contamination away from the site;
- o Cost and schedule of remedial action; and
- o Related illegal hazardous waste disposal sites and potentially responsible party involvement.

Key questions and concerns about the draft feasibility study and EPA responses are provided in the remainder of this section.

Remedial Alternatives

Question: Pemberton Township officials and residents living in the vicinity of the site asked whether EPA had selected a remedial alternative for the Lang Property site.

Response: EPA stated that a remedial alternative would be selected following an evaluation of the public's written and verbal comments. EPA will approve a Record of Decision that will describe the selected remedial action at the site. EPA said that the "no action" alternative would not be selected because "no action" does not mitigate the threat to the environment and public health posed by the site. The other alternatives all include excavation of the surficial soil (soil located from the surface of the ground to approximately three feet below the ground) with off-site disposal and ground-water extraction and treatment. EPA said, however, that alternatives 1 or 2 are more likely to be selected than any of the other alternatives. These alternatives are described as follows:

Alternative 1 exceeds Federal standards. The remedial alternative includes: excavation of surficial soils and removal to an off-site disposal facility; extraction and treatment of ground water with ion exchange, a process which reduces sodium by attracting sodium ions out of the waste water; and on-site injection of ground water.

Alternative 2 meets Federal standards. Similar to Alternative 1, the remedial alternative includes excavation of surficial soils and removal to an off-site disposal facility; and extraction of ground water, treatment, and injection. This remedial alternative does not include ion exchange.

Concern: The Pinelands Commission said that since the Pinelands Commission does not permit discharge to any surface water in the New Jersey Pinelands National Preserve, the Pinelands Commission prefers Alternatives 1 and 2. The Pinelands Commission stated that its major concerns include: (1) remediation of ground water to the greatest extent possible; and (2) no impact on surface water during the remediation effort.

Response: EPA responded to the Pinelands Commission's concerns about surface water discharge in the early stages of the preparation of the draft feasibility study. EPA is not considering discharging treated waste water into surface water in the vicinity of the site as part of the remedial action at the Lang Property site due to both technical and institutional constraints.

Concern: PTMUA stated that it supports remedial alternatives 1 and 2. PTMUA objected to the consideration of Alternative 3. (See description of alternative below.) PTMUA raised concerns about technical and institutional constraints on its ability to accept Superfund pretreated hazardous waste under the requirements of Alternative 3. Currently, PTMUA accepts only municipal waste; it has no industrial users. The facility disposes of its sludge by applying it to agricultural land designated for waste disposal. PTMUA believes that the land application of sludge must be further evaluated to determine whether the treated hazardous waste sludge will be compatable with what the facility currently accepts. In addition, PTMUA said that as a publicly owned treatment works, regulations concerning treated waste water discharge into the north branch of the Rancocas Creek will require modifications to the PTMUA's existing permit. PTMUA expressed concern that the permit modification would be a lengthy process which might delay the remedial action.

(Note: Alternative 3 includes the excavation of surficial soils and removal to an off-site disposal facility; and extraction of ground water. The ground water is pretreated, then transported to the PTMUA waste water facility for final treatment and disposal. Under this remedial alternative, PTMUA would discharge the treated waste water into the north branch of the Rancocas Creek and apply the sludge to land designated for waste disposal.)

Response: EPA said that it recognizes the technical and institutional constraints on the PTMUA accepting pretreated ground water from the site. EPA has evaluated these constraints during the RI/FS.

Concern: PTMUA expressed concern that the draft feasibility study did not adequately consider in the evaluation of the effluent discharge collection system included in Alternative 3, the potential risk to the environment and public health which might result from a leak or blockage of pretreated hazardous waste.

Response: EPA recognizes the PTMUA concern about potential adverse impacts to the environment and public health if the collection system did not operate properly. EPA will include an evaluation of this concern in the final feasibility study report.

Concern: PTMUA stated that costs for implementation, operation, and maintenance of the effluent discharge collection system to PTMUA were not included in the cost summary in the draft feasibility study report. PTMUA provided an estimate of capital and other costs to EPA for consideration.

Response: EPA stated that these costs will be evaluated and incorporated in the final feasibility study.

Question: A local official asked about the volume of ground water proposed to be pumped and injected into the site. The local official asked EPA to clarify the volume of water estimated to be extracted from the site.

Response: EPA stated that approximately ten million gallons of ground water would be pumped, treated, and injected into the ground. This extraction, treatment, and injection would be repeated three times (totalling thirty million gallons). The ground water will be treated to meet or exceed Federal drinking water standards. EPA said that the contractor has estimated that three cycles of pumping, treatment, and injection will be required to remove the contamination. EPA will monitor the level of contaminants in the ground water during the remedial action to ensure that the site meets these standards.

Question: A nearby resident asked EPA to explain what the impact will be on private water wells surrounding the site from the extraction and injection of a large volume of ground water under Alternatives 1 and 2.

Response: EPA does not anticipate an adverse impact on private water wells in the vicinity of the site because ground water is continuously being returned to the aquifer from which it is being pumped. EPA stated that the potential impact on surrounding private water wells will be carefully evaluated during the remedial design phase prior to construction of the project.

Question: A local official asked how the contamination in the subsurface soils will be eliminated since only the surficial soils will be excavated and removed from the site.

Response: EPA said that contaminants in the subsurface soils will be removed by flushing the soils with the treated ground water which will be injected into the site. Because contaminants in the subsurface soil are more mobile than contaminants in the surficial soil, repeated flushing of the subsurface soil with the treated or clean ground water will remove the soil contamination from below the excavated layer.

Concern: A resident living in the vicinity of the site expressed concern about the capacity of City Line Road to support the amount of truck traffic required to haul the excavated surficial soils away from the site. The resident said that the existing road was made of dirt and too narrow for vehicles to pass.

Response: EPA stated that the capacity for additional truck traffic on City Line Road will be further evaluated during the remedial design to determine whether the road was adequate to support construction activities. EPA said that the draft feasibility study recommended that gravel be placed on the road to improve its surface and help support the additional truck traffic during a three month excavation period.

Standards for Cleanup

Comment: The Pinelands Commission stated that the Pinelands Commission would like the ground water to be treated to background levels, or as close to background levels as possible given the limits of existing technology.

Response: EPA explained that because background levels are determined by laboratory analysis based on arbitrarily selected detection limits of contaminants, background levels do not provide well-defined criteria to measure whether an area has been cleaned of contamination. EPA relies on State and Federal standards to determine whether water quality is acceptable. The remediation criteria are included in Table 3-1 in the draft feasibility study report. EPA will use the best available technologies and processes to clean up the contamination at the site. In addition, EPA will monitor the site to ensure that the water quality meets State and Federal standards.

Comment: NJDEP provided EPA with revised State remediation criteria for a number of chemical substances.

Response: EPA will evaluate these criteria in terms of the treatment processes required in Alternatives 1 and 2.

Question: A resident asked how significantly the ground water and soils at the Lang Property site were contaminated.

Response: EPA said that the monitoring wells located on the site showed ground-water contamination of total volatile organics of 88,500 ppb (parts per billion). EPA said that the ground water at the site was significantly contaminated compared to New Jersey guidelines of 50 ppb for total volatile organics in ground water. Because State and Federal standards do not exist for soils, to ascertain the relative degree of soil contamination on the site EPA compared concentrations of contaminants in the soil on the site with soil located away from the site. Based on this parameter and others, EPA found significant contamination in the on-site soils.

Air Quality Concerns

Question: A resident asked if toxic gases could be released unexpectedly from the site.

Response: EPA said that air monitoring was conducted at the site during the RI/FS. The air monitoring conducted during the field activities showed that no release or threat of hazardous air emissions from the site is expected except during excavation or other activities which might disturb the soils. During soil excavation, EPA will carefully monitor the ambient air to ensure that workers and residents in the vicinity of the site are not threatened during construction activities.

Question: A resident asked how EPA will control dust at the site during soil excavation.

Response: EPA stated that air monitoring will be conducted during the soil excavation activities. If there is a threat of hazardous air emissions, EPA will provide dust protection and controls if necessary.

Potential Migration of Ground-water contamination away from the site

Question: A resident asked whether EPA had tested the private water well at the gun club located in the vicinity of the site and at other off-site locations.

Response: EPA stated that the ground-water monitoring program during the remedial investigation had determined the direction of ground-water flow. EPA placed a monitoring well between the contaminated area and the closest potable water well (a well used during the blueberry harvest). The monitoring well sampling results showed no contamiation. Since the potable wells in the immediate area are upgradient from the site (not in the direction of ground-water flow), no threat to private water well supplies or residents exists due to contamination at the Lang Property site.

Question: A local official asked if contamination at the site threatened existing blueberry fields and cranberry bogs.

Response: EPA responded that the cultivated fields located downgradient from the site are more than one half mile away from the areas of contamination. In addition, the Food and Drug Administration (FDA) sampled blueberries and cranberries in the area. FDA test results showed that hazardous waste contamination at the site had not affected nearby fruit crops. In addition, EPA reviewed the existing scientific literature on contaminants (specifically those identified at the Lang Property site) being taken up by plants. EPA determined that it is unlikely that plants in the area will be affected by contamination at the site.

Cost and Schedule of Remedial Action

Question: A local official asked EPA how much the remedial action at the site will cost and how long the remedial action will take to complete.

Response: EPA said that the remedial action will cost approximately $4 million. EPA stressed, however, that the cost is an estimate with a margin of error based on varying construction costs and possible design changes. In addition, EPA explained that costs for a remedial action are not fixed. The cleanup will take between three and five years and costs may vary over time. EPA also said that construction activities will be competitively bid to contractors which might affect the cost of construction.

Question: A resident asked whether Pemberton Township will incur any costs for the cleanup of the site.

Response: EPA responded that 90 percent of the cleanup funds are paid by the Federal government; 10 percent are paid by the State. EPA said that Pemberton Township will not be expected to incur any cost for clean up of the site. EPA also said, however, that municipalities sometimes choose to expend local tax dollars when the municipality determines that they want to become more involved in the construction activities at the site.

In other cases throughout the State, municipalities have decided to have a local health officer monitor the site on a weekly or monthly basis. The cost of the health officer's salary is paid by the individual municipality. In other instances, municipalities have decided that additional security is required to protect nearby residents. These municipalities have paid for increased police protection at sites. Some municipal costs may be reimbursed by the State under the Hazardous Waste Spillfund Program, a New Jersey funding mechanism available to clean up hazardous waste, if the reimbursement request meets the State criteria.

Question: A resident asked whether funding for remedial design and construction activities was available to complete the project.

Response: EPA explained that the Superfund program is currently not reauthorized and therefore Federal funds are not immediately available to begin the remedial design and construction activities at the site. EPA said that if the Superfund program is not reauthorized in the near future, the State of New Jersey may consider loaning EPA funds from the Hazardous Waste Spillfund Program. The State of New Jersey has loaned EPA funding for remedial design and construction activities at other sites in the State including: D'Imperio site; Bridgeport site; Krysowaty Farm site; and Bog Creek Farm site.

Related Illegal Hazardous Waste Disposal Sites and Potentially Responsible Party Involvement

Concern: A local official expressed concern that EPA and the State did not know where the hazardous waste containers from the Lang Property site were disposed. The local official asked whether EPA had investigated areas of potential concern that had been identified by the Burlington County Health Department and nearby residents.

Response: EPA stated that no manifests recording the disposal locations of the hazardous waste containers from the Lang Property site were available to EPA or the State. EPA is presently evaluating possible disposal areas by conducting a preliminary assessment/site inspection (PA/SI) for at least three properties identified as having allegedly received Lang Property hazardous waste containers. These properties include: Uncle Property; Pointsett Property; and Buster's Garage.

Question: A local official asked if the drums from the Lang Property site are found on another property, would this new area become part of the Lang Property site or a separate site.

Response: EPA responded that if drums from the Lang Property site were discovered on another property, the property would be evaluated as a separate potential site. EPA explained that every site has its own characteristics and requires an independent assessment to determine whether a threat to public health or the environment exists. EPA would, however, consider the discovery of abandoned drums from the Lang Property site as part of its ongoing enforcement action to determine responsibility and liability for illegal disposal of waste.

Question: An interested citizen asked whether the potentially responsible party at the Lang Property site would regain the use of the property following cleanup of the site.

Response: As part of its enforcement activities, EPA is currently evaluating the ability of potential responsible parties to contribute to the long-term cleanup of the site. Part of this evaluation will include determining the ultimate control of the site once the remedial action is completed.

D. SUMMARY OF OUTSTANDING COMMUNITY CONCERNS AND EPA'S RESPONSES

Concern about Remedial Alternatives

Concern: PTMUA opposes Alternative 3. PTMUA has informed EPA that PTMUA is not interested in accepting Superfund hazardous waste for treatment and disposal.

Response: EPA will evaluate all the constraints with regard to sending the pretreated ground water to PTMUA prior to selecting a cleanup alternative. Unless injection of treated ground water as described in Alternatives 1 and 2 (see page 6 for a description of Alternatives 1 and 2) is shown to be unacceptable, EPA will not choose Alternative 3.

Concern about Remedial Design and Construction Activities

Concern: Pemberton Township and Burlington County Health Department officials maintain a strong sense of cooperation and involvement with EPA in the cleanup of hazardous waste in the area. These officials will expect regular and timely information about the status of the remedial design and construction activities at the Lang Property site. Local officials want to be kept informed about results from ground-water and soil sampling activities.

Response: EPA will contact Pemberton Township and Burlington County Health Department officials on a regular basis to inform them of current and proposed site activities. In addition, EPA will provide an ongoing information contact and schedule of activities. EPA will also ensure that Pemberton Township and Burlington County Health Department officials receive data from ground-water monitoring wells and soil sampling during the cleanup.

Concern: Residents living in the vicinity of the Lang Property site remain interested and concerned about the remedial design and construction activities at the site. Property owners located on City Line Road expressed concerns about the capacity of the access roads to support increased truck traffic during the excavation of surficial soils from the site. In addition, residents may have concerns about noise and dust from the excavation of surficial soils.

Response: EPA will continue a community relations program at the Lang Property site to provide information to nearby residents about remedial design and construction activities. EPA will invite interested citizens in Pemberton Township to attend an information meeting prior to initiating construction activities to describe these proposed activities, provide a schedule, and answer questions. In addition, EPA will coordinate closely with the U.S. Army Corps of Engineers to ensure that concerns and questions from residents are heard and responded to by government agencies during construction activities.

Potential Migration of Contamination Away from the Site

Concern: Farmers cultivating blueberries and cranberries in the vicinity of the site will continue to have an interest in whether contamination at the Lang Property site has been cleaned up. These farmers have indicated a desire to receive sampling results and analysis from vegetative tests and ground-water monitoring conducted at the site.

Response: EPA has provided the results of previous testing in both the remedial investigation and feasibility study reports. These data show that contamination has not migrated away from the site and, therefore, fruit crops in the area have not been affected. EPA will provide additional data as it is collected and analyzed during the remedial design and construction of the selected remedial alternative.

Related Illegal Hazardous Waste Disposal Sites

Concern: Local officials, Pinelands Commission staff, and residents remain concerned about other areas in the township which may have received hazardous waste from the Lang Property site.

Response: EPA will keep interested citizens informed about ongoing evaluations of properties which have been identified as having possibly received hazardous waste from the Lang Property site.

ATTACHMENT A

PLEASE SIGN IN

Public Meeting
Lang Property Site Municipal Bldg.
August 25, 1986

	PLEASE PRINT NAME	ADDRESS
1.	Michael Callahan	BURLINGTON COUNTY TIMES ROUTE 130 WILLINGBORO, NJ 08046
2.	ALBERT T MYERS	172 CITY LINE RD BROWNS MILLS NJ 08015
3.	MARVIN RONIS	BURLINGTON COUNTY HEALTH DEPT MT. HOLLY, NJ 08060
4.	MR + MRS. George F. Hodgson	44 Railway - Route #1 Browns Mills, N.J.
5.	Bud. Doyle	PINELANDS
6.	T. Marchetta	144 CITYLINE RD -
7.	C F GRAF	10 PHILLIPS AVE - BROWNS MILLS
8.	Charles Sprague	25 Fairfield St. BM
9.	Edward H Chrisman	P. O Box 654 Pemberton Burlington County Health Dept Woodlane Rd Mt. Holly, NJ 08060
10.	Kevin Biglin	
11.	Elizabeth Hazelton	PO Box 175, New Lisbon
12.	Joseph Goodwin	905 RED FEATHER TR BROWNS MILLS
13.	John Mason	Pemberton Twp Adm.
14.	[illegible]	Pemberton Twp Committee
15.	[illegible]	Pemb. Twp Solicitor
16.	[illegible]	Mayor Pemb Twp
17.	Albert T Myers	Deputy Mayor Pemb Twp
18.	SANDRA CONDIT / Congressman SAXTON	PO 38 Mt. Holly NJ
19.	Marie Ferrara-Reynolds / Community News	PO Box 119, Browns Mills NJ 08015
20.	Carlene Williams	1602 E Lakeshore Dr.
21.	Kevin Casamassa	New Jersey DEP CN 029 TRENTON NJ
22.	John E. Hires	PO Box 46 New Lisbon, NJ 08064
23.		
24.		
25.		
26.		

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ATTACHMENT B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

AGENDA

Public Meeting
Lang Property Site
Municipal Building
Pemberton Township, New Jersey

August 25, 1986
7:30 P.M.

I.	Introduction	John Czapor, Chief Site Compliance Branch U.S. EPA Region 2
II.	Overview of the Superfund Program	John Czapor, Chief Site Compliance Branch U.S. EPA, Region 2
III.	Discussion of the Results of the Remedial Investigation Report & Draft Feasibility Study	Perry Katz, Project Manager Lang Property Site U.S. EPA, Region 2 & Edward Hagarty Project Engineer C.C. Johnson Associates (Consultants to EPA)
IV.	Questions & Answers	
IV.	Closing	

OTHER REPRESENTATIVES

Kevin Psarianos, Site Manager
Division of Hazardous Site Mitigation
N.J. Department of Environmental Protection

Rachel Pohl, Community Relations Specialist
ICF, Incorporated
(EPA's Consultants)

ATTACHMENT C

United States
Environmental Protection
Agency

Region 2
26 Federal Plaza
New York, N.Y. 10278

New Jersey
New York
Puerto Rico
Virgin Islands

Official Business
Penalty for Private Use
$300

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335

EPA Environmental Facts

LANG PROPERTY
PEMBERTON TWP./BURLINGTON COUNTY

STATUS ADVISORY
Evaluation of Remedial Alternatives

SITE DESCRIPTION

The Lang Property site is located in Pemberton Township, Burlington County, New Jersey. The site is 8 miles southeast of the Borough of Pemberton and south of New Jersey State Route 70. The 40-acre tract of land is rectangular in shape and is owned by Edward and Florence Lang. Access to the property is via an unpaved road which branches from another unpaved road located close to the southern boundary of the property. Restrictions to public access to the property are minimal.

The property is situated within the Pinelands National Preserve. This tract of land supports a forest of small pine trees and fields which had previously been used for cultivating cranberries and to a lesser extent, blueberries. A hunting and fishing lodge had been operated on another portion of the property, but this facility was destroyed by fire and only the foundation remains. A clearing at the end of the site's access road was used as a dumping area for old tires, abandoned automobiles, furniture, and appliances.

NATURE OF PROBLEM

Portions of the Lang Property were used for the illegal dumping of 55-gallon drums containing hazardous waste materials of unknown origin and composition. It has been estimated that between 1200 and 1500 drums were at one time located at the site. It is thought that the contents of these drums were the source of all subsequent contamination occurring at the site.

The site apparently became contaminated as a result of one or more of the following events: a) inadvertant leakage of wastes from drums left at the site, b) inadvertant spillage of wastes onto the ground's surface during early attempts by site owners to remove drums from the site or, c) intentional emptying of drum contents prior to removing drums from the site.

The Remedial Investigation and Feasibility Study (RI/FS) began in October, 1984. A draft RI/FS was completed in July, 1986.

CONCLUSIONS OF REMEDIAL INVESTIGATION

1. Surficial soils (1-3 feet) in a two acre portion of the four acre clearing where disposal took place are contaminated with volatile organic compounds and metals. Vertical contamination of soils in portions of the site known to contain chemical pollutants was limited to a maximum depth of twenty feet.

2. Surface water and, sediment samples collected from areas of ponded water within the on-site disposal area were contaminated with volatile organics as were samples collected from a location along the ditch draining the site. This ditch was in a position to receive surface water draining from the on-site disposal area.

3. Shallow groundwater beneath the on-site disposal area is contaminated by volatile organic compounds and metals. Although, this contaminated groundwater plume could have limited concentric migration, its migration is principally in a northwesterly direction and contaminants have migrated approximately three to five hundred feet from the disposal area. Groundwater below a depth of thirty feet shows no signs of contamination.

4. Based on a review of site conditions, toxicological information regarding plant uptake of pollutants, and sampling of blueberries in close proximity to the site, there is no evidence of contamination of nearby blueberry and cranberry fields due to the Lang Property site.

5. There is no evidence of contamination of air at the Lang Property site.

FEASIBILITY STUDY

A draft Remedial Investigation/Feasibility Study (RF/FS), which evaluated remedial alternatives was completed for the Lang Property Site in July, 1986. A comprehensive list of remedial technologies was screened in accordance with EPA guidance and criteria (technical, environmental and public health, institutional and cost criteria were considered). The results of the screening procedure identified the feasible remedial alternatives which are outlined below:

ALTERNATIVES:

Alternative 1

Excavation and off-site disposal of surface (1-3 feet) soils, collection and treatment(exceeding Federal standards) of groundwater, injection of treated groundwater back into the site.

Alternative 2

Excavation and off-site disposal of surface (1-3 feet) soils, collection and treatment (attaining Federal Standards) of groundwater, injection of treated groundwater back into the site.

Alternative 3

Excavation and off-site disposal of surface (1-3 feet) soils, groundwater extraction and pre-treatment, effluent piped to the Pemberton Township Municipal Utilities Authority with eventual effluent discharge to the North Branch of the Rancocas Creek.

Alternative 4

Excavation and off-site disposal of surface (1-3 feet) soils, minimal volume groundwater extraction and shipment of groundwater to an off-site treatment facility.

Alternative 5

Excavation and off-site disposal of surface (1-3 feet) soils, groundwater extraction and shipment of groundwater to an off-site treatment facility.

Alternative 6

No action, installation of additional monitoring wells and groundwater monitoring.

PUBLIC COMMENTS:

Written comments will be accepted throughout the three week public comment period which ends on September 8, 1986. All comments regarding the evaluation of remedial alternatives will be considered in determining our final selection of a remedial alternative for the Lang Property site. Comments should be forwarded to:

Mr. Perry Katz
New Jersey Site Compliance Branch
U.S. Environmental Protection Agency
26 Federal Plaza, Room 737
New York, New York 10278

FOR FURTHER INFORMATION:

For further information concerning the proposed CERCLA action at the Lang Property site, contact EPA's Superfund Information toll-free line by calling Rick Wice at 1-(800)-346-5009.